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## NEW PHILIPPINE GALL MIDGES, WITH A KEY TO THE ITONIDIDÆ

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ONE PLATE

Comparatively little appears to have been done on the gall midges of the Philippine Islands, although several papers, in recent years, have discussed the insect galls of that general region, mostly without descriptions of the adults. It is probable that some of the deformities characterized earlier without the bestowal of scientific names are the work of species described below. There is a large and interesting gall-midge fauna in the Philippines, and this contribution is to be considered as only an introduction to work that should be prosecuted systematically and upon a much more extended scale, if there is to be an adequate understanding of this large group of minute forms.

The richness and diversity of the Philippine fauna is suggested by the fact that in the State of New York practically six hundred species, belonging to seventy-five genera, have been already recognized and the ground has been, by no means, thoroughly covered. Of the Itonididæ there are now known approximately three hundred genera and nearly three thousand species with much yet to be learned concerning the faunæ of subtropical and tropical regions.

The student will find J. J. Kieffer's work<sup>1</sup> one of the most comprehensive for the study of this group as a whole, and the references given in that volume serve as a ready index to a voluminous and widely scattered literature.

<sup>1</sup> *Diptera: Family Cecidomyidæ. Genera Insectorum, Fascicle 152 (1913).*

The present paper describes a number of species collected by Mr. Leopoldo B. Uichanco and transmitted for study by Prof. Charles S. Banks, College of Agriculture, University of the Philippines. The collection contained but fourteen species, all new. Five of these are referable to new genera, which are remarkable because of peculiar structures or notable specialization, such, for example, as *Kronodiplosis*, a member of the bifili easily recognized by the uniarticulate palpi; and *Kamptodiplosis* and *Heliodiplosis*, two genera allied to the peculiar subtropical *Kalodiplosis* Felt, though easily distinguished by the fewer and relatively longer circumfila,<sup>2</sup> the greater prolongation of the flagellate antennal segments of the male, and the shorter palpi.

Genus **LUZONOMYIA** novum

This genus is erected for a small midge presenting close affinities with *Oligotrophus* Latr., from which it is most easily separated by the distinctly produced basal clasp segment of the male and the small subapical terminal clasp segment.

Type of the genus, *Luzonomyia symphoremæ* sp. nov.

*Luzonomyia symphoremæ* sp. nov.

*Male*.—Length, 1.5 millimeters. Antennæ nearly as long as the body, dark brown, sparsely haired; 14 segments, first segment broadly obconic, second subglobose, third and fourth weakly fused, fifth with a stem one-fourth the length of cylindrical basal portion, which has a length about three times its diameter, a rather thick basal whorl of moderately long, stout setæ, a scattering subapical band of longer, slenderer setæ, and low circumfila at basal third and apicad; terminal segment missing. First segment of palpi short, irregular; second moderately broad, with a length about twice its diameter; third a little shorter than second, irregularly pyriform. Mesonotum dark yellowish brown, the fuscous yellowish submedian lines sparsely haired. Scutellum and postscutellum yellowish. Abdomen thickly haired, dark yellowish brown. Wings hyaline. Costa dark brown, subcosta uniting with margin at basal third, the third vein at apex, fifth at distal fourth, its branch at basal third. Halteres nearly uniform fuscous yellowish. Coxæ a variable dark brown. Legs mostly dark brown. Claws moderately long, slender, rather strongly curved apicad, simple, pulvilli a little shorter than claws. Genitalia: Basal clasp segment moderately long, stout, considerably swollen near distal third, at which point the terminal clasp

<sup>2</sup> Equivalent to Kieffer's "verticilli arcuati."—C. S. B.

segment is attached, the distal lobe being broad, broadly rounded and thickly setose, terminal clasp segment subapical, short, stout, somewhat curved, strongly chitinized and unidentate apicad; dorsal plate moderately long, broad, deeply and triangularly emarginate, the lobes rather thickly and irregularly rounded and margined with rather sparse, stout setæ; ventral plate moderately long, broad, deeply and narrowly incised, the lobes rather broadly rounded and sparsely margined with coarse setæ. Style moderately long, stout and broadly rounded apicad.

*Female*.—Length, 2 millimeters. Antennæ a little shorter than the body, reddish brown, sparsely long-haired; 14 segments, the fifth with a stem one-fourth the length of cylindrical basal enlargement, which has a length about three and a half times its diameter, a sparse basal whorl of rather stout setæ, a broad subapical band of longer, slenderer setæ, and low circumfila at basal fourth and apicad. Segments progressively somewhat shorter, twelfth with a length a little over twice its diameter, thirteenth with a length one and a half times its diameter, and fourteenth with a length a little greater than its diameter. First segment of palpi subquadrate, second rather broad with a length about two and a half times its diameter, third as long as the second and slightly dilated. Mesonotum dark yellowish brown, the yellowish submedian lines sparsely haired. Scutellum and postscutellum brownish yellow. Abdomen reddish brown, rather thickly haired; terminal segment somewhat darker. Ovipositor short, moderately stout, yellowish basad, and with a length about one-fourth the abdomen. The terminal lobes irregularly triangular and sparsely and coarsely setose. Halteres yellowish white, fuscous subapicad. Coxæ mostly pale yellowish. Legs dark brown. Other structures practically as in male.

*Type*.—Cecid. a2850, New York State collection; paratype, No. 18315, in College of Agriculture, Los Baños, P. I.

LUZON, Laguna Province, Los Baños and Mount Maquiling, 1917, College of Agriculture accession No. 18315 (*L. B. Uichanco*). A large series of this remarkable form was reared from leaf galls on *Symphorema luzonicum* F. Vill.

#### Genus DICEROMYIA novum

Allied to, though easily separated from, *Zalepidota* Rübsaamen by the greatly produced tapering spurs or horns at distal angles of terminal clasp segment. The subcostal cell is not remarkably broad. The female is unknown, but the characters of the male abundantly justify the above association.

Type of the genus, *Diceromyia vernoniæ* sp. nov.

*Diceromyia vernoniæ* sp. nov.

*Male*.—Length, 1.5 millimeters. Antennæ nearly as long as the body, dark brown, almost naked; 14 segments, first segment obconical; second short, the length a little greater than its diameter; the other segments cylindric, sessile; fifth with a length three and a half times its diameter; terminal segment somewhat produced, tapering slightly and with a length about four times its diameter. Each of the flagellate segments is rather thickly clothed with short, curved flattened hairs and has unusually heavy, strongly convoluted circumfila, somewhat suggesting the structure in *Schizomyia* Kieff. though lower and relatively thicker. Palpi much reduced, apparently composed of one short, broadly oval segment bearing a few stout setæ apicad. Mesonotum shining dark brown, the submedian lines sparsely haired, the median area lighter. Scutellum reddish brown. Postscutellum a little darker. Abdomen yellowish brown. Wings moderately broad, hyaline, subcosta uniting with margin near basal third, the third vein nearly straight and extending to apex of wing, fifth vein uniting with posterior margin at distal fourth, its branch near basal half. Halteres yellowish, transparent basad, reddish apicad. Legs a variable reddish brown. Claws moderately stout, strongly curved, simple; pulvilli nearly as long as claws. Genitalia small, basal clasp segment moderately long, stout, narrowly oval; terminal clasp segment with a length more than twice its diameter, the distal angles being produced as strongly chitinized tapering spines or horns, with a length nearly equal to diameter of segment; dorsal plate apparently divided, lobes divergent, narrowly oval, and sparsely setose; ventral plate deeply and triangularly emarginate, the lobes tapering to a narrowly rounded, setose apex. Style moderately long, narrow and tapering to a narrowly rounded apex.

*Type*.—Cecid. a2842, New York State collection.

LUZON, Laguna, Mount Maquiling, 1917, College of Agriculture accession No. 18143 (*Uichanco*), three males reared from leaf galls on *Vernonia lancifolia* Merr. No description of the gall was given, and the female is unknown.

*Asphondylia vitea* sp. nov.

*Male*.—Length, 2 millimeters. Antennæ as long as the body, light brown, thickly short-haired; 14 segments, the fifth with a length about three and a half times its diameter, the others successively longer, thirteenth having a length fully six times its diameter and fourteenth being still longer and slenderer.

Circumfila moderately stout. First segment of palpi short, subquadrate, second with a length nearly three times its diameter, third one-half longer than second. Mesonotum reddish brown, anterior lateral margins narrowly yellowish, sparsely haired. Scutellum and postscutellum yellowish. Abdomen reddish brown, rather thickly yellow-haired. Wings hyaline. Halteres reddish brown. Coxæ, femora, and tibiæ mostly yellowish brown; tarsi lighter. Claws moderately stout, pulvilli nearly as long as claws. Genitalia: Basal clasp segment very short, stout, subglobose; terminal clasp segment short, narrowly oval, heavily chitinated apicad and bidentate; dorsal plate divided, the lobes broadly oval, setose; ventral plate short, triangular, roundly emarginate distad.

*Female*.—Length, 3 millimeters. Antennæ as long as the body, light brown; 14 segments, fifth with a length about four times its diameter, thirteenth with a length about two and a half times its diameter, fourteenth with a length about three-fourths its diameter. First segment of palpi short, oval; second greatly produced, with a length more than six times its diameter and narrowly fusiform. Mesonotum dark brown, the submedian lines sparsely haired, the lateral angles narrowly yellowish. Scutellum and postscutellum yellowish brown. Abdomen dark reddish brown, rather thickly haired. Halteres yellowish brown. Coxæ dark brown. Legs a variable dark brown. Claws moderately heavy, strongly curved; pulvilli nearly as long as claws. Ovipositor when extended with a length about equal to the abdomen, the dorsal pouch moderately large and thickly clothed with short stout hairs.

*Type*.—Cecid. a2839, New York State collection; cotypes, male and female, Bureau of Science entomological collection No. 3252 (slide mounts) and No. 14267.

LUZON, Manila, 1905, Bureau of Science accession No. 3232 (*C. S. Banks*); Manila, 1907, Bureau of Science accession No. 6650 (*W. Schultze*), reared from stem galls on *Cissus trifolia* (L.) K. Sch.; Manila, 1910, Bureau of Science accession No. 14267 (*E. D. Merrill*). There was no description of the gall. This species is peculiar in the marked production of the distal antennal segments.

*Asphondylia callicarpæ* sp. nov.

*Male*.—Length, 1.5 millimeters. Antennæ nearly as long as the body, dark brown; 14 segments, fifth with a length about four and a half times its diameter, distal segment with a length about three times its diameter, each flagellate segment with

numerous short scalelike hairs and moderately stout circumfila. First segment of palpi short, quadrate; second with a length about three times its diameter, moderately stout; third a little longer and more slender. Mesonotum dark reddish brown, the submedian lines sparsely haired. Scutellum and postscutellum reddish brown. Abdomen dark reddish brown, sparsely haired. Wings hyaline. Halteres whitish basad, fuscous apicad. Anterior coxæ dark brown, mid and posterior coxæ reddish brown. Femora and tibiæ mostly pale straw, tarsi reddish brown. Claws moderately long, strongly curved, pulvilli a little shorter than claws. Genitalia: Basal clasp segment very stout, short, broadly rounded; terminal clasp segment very short, almost subglobose, strongly chitinized and bidentate apicad; other structures obscured in the preparation.

*Female*.—Length, 2 millimeters. Antennæ nearly as long as body, reddish brown; 14 segments, length of fifth segment nearly four times its diameter, thirteenth segment with a length a little over twice its diameter, fourteenth with a length about three-fourths its diameter. First segment of palpi probably subquadrate, second greatly produced with a length about five times its diameter and somewhat fusiform apicad. Mesonotum slaty brown, the submedian lines sparsely haired. Scutellum reddish brown. Postscutellum yellowish brown. Abdomen dark brown, basal portion of ovipositor yellowish orange. Halteres yellowish basad, fuscous apicad. Coxæ dark brown, femora and tibiæ basad mostly yellowish brown, distal portion of tibiæ and tarsi dark brown. Ovipositor, when extended, about as long as body, the dorsal pouch well developed.

Exuviae with thoracic horns stout and heavily chitinized, and with a rounded antennal margin finely and irregularly dentate. (Described from a fragment.)

*Type*.—Cecid. a2843, New York State collection; paratypes, male and female, No. 18147, College of Agriculture.

LUZON, Laguna, Mount Maquiling, 1917, College of Agriculture accession No. 18147 (*Uichanco*), reared from leaf galls from *Callicarpa erioclona* Schauer. There was no description of the gall.

*Schizomyia acalyphæ* sp. nov.

*Female*.—Length, 1.5 millimeters. Antennæ about one-half the length of the body, dark brown, rather thickly short-haired, basal segments yellowish; 14 subsessile segments; fifth segment with a very short stem; basal portion of second with a length over three times its diameter, thickly clothed with rather

long, dark, scalelike hairs and with a low heavy circumfilum at the basal third and apicad; twelfth segment with a length about twice its diameter; thirteenth with a length less than one-half greater than its diameter; fourteenth with a length a very little greater than its diameter. First segment of palpi short, irregular; second stouter with a length about twice its width; third one-half longer, slenderer; fourth a little longer and more dilated than third. Mesonotum yellowish brown. Scutellum and post-scutellum pale yellowish. Abdomen dark brown, rather thickly clothed with yellowish hairs. Ovipositor when extended nearly as long as body, basal portion yellowish brown, distal part moderately stout, slightly chitinized apicad and with distinct, triangular, sparsely setose lobes. Wings hyaline, third vein uniting with costa just beyond apex, fifth at distal fourth, its branch at basal third. Halteres yellowish, transparent. Coxæ pale yellowish. Femora mostly yellowish or yellowish brown. Tibiæ and tarsi dark brown. Claws moderately long, slender, evenly curved; pulvilli a little shorter than claws.

*Type*.—Cecid. a2848, New York State collection; part of type material, No. 18313, College of Agriculture, Los Baños, one pinned specimen and one microscopical slide.

LUZON, Laguna, Los Baños, 1917, College of Agriculture accession No. 18313 (*Uichanco*), reared from leaf galls on *Acalypha stipulacea* Klotz. The adults are quite different from those of *S. diplodisci* Felt in the shorter antennæ and decidedly less chitinized condition of the terminal portion of the ovipositor of the female.

*Schizomyia diplodisci* sp. nov.

*Male*.—Length, 2 millimeters. Antennæ a little shorter than body, dark brown, thickly short-haired; 14 segments, fifth sub-sessile, the stem about one-ninth the length of the subcylindric, slightly constricted segment, which has a length over three times its diameter. Circumfila stout, moderately low, the scalelike hairs half the length of the segment, rather thick and unusually stout. Terminal segment slightly produced, basal portion with a length about three and one-half times its diameter and with an irregular globose knob apicad. First segment of palpi irregularly ovate; second with a length three times its width, rather stout; third one-half longer, slenderer; fourth fully one-half longer than third, slenderer. Color as in the female. Genitalia: Basal clasp segment moderately long, stout, the distal portion produced as a narrowly rounded, thickly setose process; terminal clasp segment subapical, short, stout, recurved and

somewhat chitinous apicad; dorsal plate short, broad, deeply and roundly emarginate, the broad lobes broadly rounded; ventral plate a little longer, broad, broadly and roundly emarginate. Style slender, acute apicad.

*Female*.—Length, 2 millimeters. Antennæ nearly as long as the body, reddish brown, whitish basad, thickly haired; 14 segments, fifth subsessile, the stem about one-ninth the length of basal enlargement, the latter with a length fully four times its diameter and rather thickly clothed with dark, broad, scalelike hairs, each with a length about half that of the segment. First segment of palpi irregular; second with a length nearly four times its diameter; third a little longer, broader; fourth one-half longer than third, slenderer. Face yellowish. Eyes black. Mesonotum yellowish red, median area more yellowish, submedian lines rather sparsely clothed with fine setæ. There are also lines of long, stout setæ on the anterolateral margins. Scutellum pale yellowish, with a few stout, dark setæ. Post-scutellum yellowish. Abdomen a yellowish red, rather thickly clothed with short, stout setæ. Ovipositor when extended nearly as long as body, basal portion yellowish, distal part aciculate as in *Asphondylia*. Wings slightly fuscous, due to the rather thick covering of dark scales. Halteres yellowish basad, reddish yellow apicad. Coxæ mostly yellowish. Femora reddish brown. Tibiæ reddish basad, dark brown distad, the tarsi almost black.

*Type*.—Cecid. a2849, New York State collection; paratypes, male and female, No. 18314, College of Agriculture, Los Baños.

LUZON, Laguna, Mount Maquiling, August 29 and September 3 and 6, 1917, College of Agriculture accession No. 18314 (*Uichanco*), reared from terminal stem galls on lateral branches of *Diplodiscus paniculatus* Turcz.

*Lasioptera manilensis* sp. nov.

*Female*.—Length, 1.75 millimeters. Antennæ extending to base of abdomen, dark brown with a reddish cast, yellowish basad; 23 segments, fifth with a length nearly equal to its diameter, terminal segment subglobose or ovate. First segment of palpi subquadrate; second a little longer, broad; third more than twice the length of second, slender; fourth a little longer, slenderer than third. Face yellowish. Eyes black. Mesonotum golden brown, submedian lines and lateral areas rather thickly clothed with golden scales. Scutellum pale golden yellow. Postscutellum pale yellowish. Abdomen a rich, reddish brown, basal segment golden yellow, second to seventh segments

marginated caudad with golden yellow scales, terminal segment yellowish. Wings slightly fuscous. Costa dark brown with anterior margin thickly clothed with golden scales, subcosta uniting with margin near basal third, third vein at distal third. Halteres, coxæ, femora, and tibiæ golden yellow; tarsi mostly dark brown; claws moderately stout, strongly bidentate, pulvilli as long as claws. Ovipositor when extended about one-third the length of abdomen, moderately stout; basad there is an oval patch of short, stout, thickly set chitinous spines; and the rather broad terminal lobes are ornamented dorsad with a series of moderately heavy, recurved, chitinous processes and laterad and basad with scattering and short, stout chitinous spines.

*Type*.—Cecid. a2851, New York State collection; paratypes, male and female, No. 18318, College of Agriculture, Los Baños, one microscopical mount labeled: "Type" No. 18318.

LUZON, Laguna, Los Baños and Mount Maquiling, 1917, College of Agriculture accession No. 18318 (*Uichanco*), reared from leaf galls on *Leea manillensis* Walp.

#### Genus **KRONODIPLOSIS** novum

This peculiar genus is easily distinguished from all other bifili by the unidentate claws and the uniarticulate palpi. Other distinguishing characters are given in the detailed description of the species.

Type of the genus, *Kronodiplosis uichancoi* sp. nov.

*Kronodiplosis uichancoi* sp. nov.

*Male*.—Length, 1.25 millimeters. Antennæ probably one-half longer than body, yellowish bronze, thickly haired; probably 14 segments, third and fourth apparently fused, fifth with stems one and a half and one-half their diameters, respectively, the basal stem being little more than a deep constriction of what otherwise would have been a cylindrical basal enlargement, each swelling with a moderately thick whorl of long, stout setæ and a circumfilum, the loops on basal enlargement extending nearly to middle of distal enlargement and those on the latter almost to apex of segment. Terminal segments missing. Palpi composed of one broadly fusiform, sparsely haired segment. Eyes large, black, confluent. Mesonotum nearly smooth and variable yellowish brown. Scutellum and postscutellum yellowish brown. Abdomen a little darker, thickly haired. Genitalia lighter. Wings hyaline, subcosta uniting with costa at basal third; third vein just beyond apex, fifth at distal fourth, its branch at basal third. Halteres yellowish, transparent. Coxæ yellowish. Legs

mostly pale straw. Claws on at least the anterior two pairs of legs moderately long, strongly bidentate, pulvilli as long as claws. Genitalia: Basal clasp moderately long, stout; terminal clasp segment moderately chitinized apicad; dorsal plate long, broad, deeply and roundly emarginate, the lobes somewhat divergent, broadly rounded and sparsely setose apicad; ventral plate long, broad, broadly and slightly emarginate; harpes indistinct; style long, slender, narrowly rounded apicad.

*Type*.—Cecid. a2847, New York State collection, paratype, male, No. 18307, College of Agriculture, Los Baños.

LUZON, Laguna, Los Baños, 1917, College of Agriculture accession No. 18307 (*Uichanco*), reared from leaf galls on *Barringtonia luzonensis* Rolfe.

#### Genus **KAMPTODIPLISIS** novum

This genus is allied to the subtropical *Kalodiplosis* Felt, from which it is most easily separated by the more produced flagellate antennal segments of the male, the longer circumfila with fewer and slenderer loops, the greatly reduced palpi, and the very short dorsal and ventral plates.

Type of the genus, *Kamptodiplosis reducta* sp. nov.

*Kamptodiplosis reducta* sp. nov.

*Male*.—Length, 1.75 millimeters. Antennæ one-half longer than body, bronzy yellow, thickly haired; ? 14 segments; first segment somewhat produced, subcylindric, with a length about one-half greater than its diameter; second hemispheric; third and fourth free; the stems of fifth each with a length about two and one-half times its diameter, the basal enlargement subglobose, with a subbasal whorl of long stout setæ and a subapical circumfilum, the loops moderately long, stout and not excessively numerous, distal enlargement subcylindric, with a length one-half greater than its diameter, slightly constricted near basal third, basad with a circumfilum, the loops moderately long, near the middle a whorl of long stout setæ and apicad a circumfilum, the loops a little longer and extending nearly to apex of segment; terminal segment missing. Palpi short; first segment irregularly quadrate; second a little longer, broadly oval; third as long as second, broadly oval. Mesonotum reddish brown, the submedian lines yellowish. Scutellum and postscutellum pale yellowish. Abdomen yellowish brown, rather thickly haired. Genitalia yellowish fuscous. Wings hyaline. Costa pale straw, subcosta uniting with margin near basal third, third vein well

beyond apex, fifth indistinct distad, joining posterior margin at distal third, its branch near basal third. Halteres pale yellowish. Coxæ yellowish brown. Legs pale straw. Claws moderately long, strongly curved, unidentate. Pulvilli as long as claws. Genitalia: Basal clasp segment rather long, stout; terminal clasp segment nearly as long, moderately stout and distinctly curved at distal fourth; dorsal plate short, broad, deeply and triangularly emarginate, the lobes somewhat divergent, obliquely truncate distad and sparsely setose; ventral plate short, broad, broadly and roundly emarginate, the lobes obtuse, each with a stout seta, style greatly produced and tapering to a narrowly rounded apex.

*Female*.—Length, 1.5 millimeters. Antennæ nearly as long as body, brownish yellow, thickly haired; ? 14 segments, fifth with a stem three-fourths the length of the cylindric basal enlargement, which has a length two and one-half times its diameter, a moderately thick subbasal whorl of long stout setæ, a subapical band of long, slenderer setæ and low circumfila, apparently anastomosing and extending from basal fourth to apex of enlargement. First segment of palpi short, irregular; second with a length nearly three times its width; third about two-thirds the length of second, somewhat expanded. Mesonotum a variable yellowish. Scutellum and postscutellum pale yellowish. Abdomen reddish, sparsely haired. Halteres, coxæ, and femora yellowish transparent. Tibiæ and tarsi pale straw. Ovipositor short, terminal lobes narrowly oval, tapering, subacute apicad and thickly clothed with coarse setæ.

*Type*.—Cecid. a2852, New York State collection.

LUZON, Laguna, Balong Bulo Hill, near Los Baños, 1917, College of Agriculture accession No. 18319 (*Uichanco*), reared from leaf galls on *Siphonodon celastrineus* Griff.

#### Genus *HELIODIPLISIS* novum

The unidentate claws and the short triarticulate palpi show an affinity with *Kamptodiplosis*, from which this genus is easily separated by the structure of the ovipositor.

Type of the genus, *Heliodiplosis spatholobi* sp. nov.

*Heliodiplosis spatholobi* sp. nov.

*Female*.—Length, 1 millimeter. Antennæ nearly as long as body, sparsely haired; 13 segments, fifth with a stem one-third the length of cylindric basal enlargement, which has a length twice its diameter, a subbasal whorl of moderately stout setæ,

a subapical band of slenderer setæ and subbasal and apical, heavy circumfila, the loops of the former moderately short, those of the latter produced and extending almost to apex of segment. Terminal segment slightly reduced, with a length over twice its diameter and a knoblike apex. Palpi triarticulate, first segment subglobose, second broadly quadrate, third produced, tapering, with a length about four times its diameter. Eyes large, black. Mesonotum dark reddish brown, submedian lines fuscous yellowish. Scutellum and postscutellum reddish yellow. Abdomen dark reddish brown. Ovipositor fuscous. Wings hyaline. Costa dark brown, subcosta uniting therewith at basal third, third vein nearly straight and joining margin well beyond apex; fifth vein simple, subobsolete distad, uniting with posterior margin at distal third, its branch at basal half. Halteres yellowish basad, fuscous apicad. Coxæ dark brown; femora, tibiæ, and basal tarsal segments mostly dark brown; three distal tarsal segments yellowish red. Posterior legs a little darker than anterior and midlegs. Claws moderately stout, strongly curved, unidentate; pulvilli a little shorter than claws. Ovipositor when produced about one-third the length of abdomen; basal portion long, stout, somewhat chitinized, tapering; terminal lobes slender, with a length about five times the width and apicad with a few long setæ.

*Type*.—Cecid. a2853, New York State collection.

LUZON, Laguna, Mount Maquiling, 1917, College of Agriculture accession No. 18341 (*Uichanco*), reared from leaf galls on *Spatholobus gyrocarpus* (Wall.) Benth.

*Profeltiella orientalis* sp. nov.

*Male*.—Length, 1.5 millimeters. Antennæ probably a little longer than the body, bronzy yellow, thickly haired; ? 14 segments, third and fourth free, fifth with stems each two and one-half times its diameter. Basal enlargement subglobose, with a subbasal whorl of long stout setæ and a subapical circumfilum, loops of latter extending almost to the subcylindric distal enlargement, which has a length about one-fourth greater than its diameter, a subbasal circumfilum, with loops reaching nearly to tip of the enlargement, a subapical whorl of long stout setæ and an apical circumfilum, the loops of the latter extending almost to apex of segment. Terminal segment wanting. First segment of palpi irregular, subquadrate; second with a length nearly three times its diameter; third a little longer, moderately stout; fourth narrowly oval and a little shorter than third.

Mesonotum yellowish brown, scutellum and postscutellum yellowish, transparent. Abdomen pale yellowish, sparsely haired. Wings hyaline, long, narrow, with a length two and one-half times the width; subcosta uniting with costa near basal fourth; third vein curved distad, joining margin well beyond apex; fifth vein uniting with posterior margin at distal fourth, its branch near basal half. Halteres yellowish, transparent. Coxæ and femora mostly pale yellowish, tibiæ and tarsi pale straw. Claws wanting. Genitalia: Basal clasp segment moderately long, stout; terminal clasp segment long, stout, tapering, evenly curved; dorsal plate moderately long, broad, deeply and triangularly emarginate, the lobes sparsely setose and tapering to a narrowly rounded apex; ventral plate moderately long, broad, deeply and roundly emarginate, the lobes irregularly truncate and sparsely setose; style long, stout, narrowly rounded apicad.

*Type*.—Cecid. a2852a, New York State collection.

LUZON, Laguna, Balong Bulo Hill, near Los Baños, 1917, College of Agriculture accession No. 18389 (*Uichanco*). The one male described was reared in association with the unique *Kampodiplosis reducta* Felt from leaf galls on *Siphonodon celastri-neus* Griff. The generic reference is tentative. This species, like its German congener *P. ranunculi* Kieff.,<sup>1</sup> is quite possibly a predaceous inhabitant of other galls.

*Tricontarinia luzonensis* sp. nov.

*Male*.—Length, 1 millimeter. Antennæ one-half longer than body, light brown, thickly haired; 14 segments, third and fourth segments fused; fourth with stems each with a length twice their diameter, enlargements subglobose, the basal with a sparse whorl of moderately stout setæ and a circumfilum, the loops of the latter extending to base of slightly prolonged distal enlargement, which has subbasal and subapical circumfila, the loops of latter extending to apex of segment and a median whorl of moderately stout setæ. First segment of palpi subquadrate, second with a length about three times its diameter, third about as long as second. Mesonotum shining dark brown. Scutellum and postscutellum reddish brown. Abdomen yellowish brown. Wings hyaline, third vein uniting with margin just before apex, fifth at distal third, its branch near basal half. Halteres whitish. Coxæ yellowish. Femora mostly whitish. Tibiæ and tarsi dark brown. Genitalia: Basal clasp segment moderately long,

<sup>1</sup> Gen. Ins., Fasc. 152 (1913), 195.

rather slender; terminal clasp segment long, slender, slightly curved; dorsal plate moderately long, deeply and triangularly emarginate, the broad lobes divergent and broadly rounded apicad; ventral plate a little shorter, broad, broadly rounded; harpes short, stout, and with a dense fringe of long chitinated spines apicad; style long, slender, truncate.

*Female*.—Length, 1.5 millimeters. Antennæ nearly as long as body, reddish brown, sparsely haired; 14 segments, fifth with a stem as long as subcylindrical basal enlargement, which has a length one-half greater than its diameter and is strongly constricted near the middle; there is a sparse whorl of long, moderately stout setæ basad and near the middle a circumfilum with moderately high loops and another with loops one-half the length of the stem. Terminal segment somewhat produced, its length about three times its diameter and tapering to a broadly rounded apex. First segment of palpi irregular; second rather long, slender; third one-half longer, dilated. Mesonotum, scutellum, and postscutellum shining dark brown. Abdomen brownish red, fuscous basad. Halteres whitish, transparent. Coxæ yellowish. Femora and tibiæ pale straw, tarsi a little darker. Claws moderately long, slender, strongly curved, pulvilli a little shorter than claws. Ovipositor short, stout, the lobes narrowly oval and sparsely setose, otherwise nearly as in male.

*Type*.—Cecid. a2844, New York State collection; paratype, No. 18151, College of Agriculture, Los Baños.

LUZON, Laguna, Mount Maquiling, 1917, College of Agriculture accession No. 18151 (*Uichanco*), reared from leaf galls on *Parashorea malaanonan* (Blanco) Merrill. The generic reference is tentative, and from an examination of the insects I am inclined to believe that this species may be predaceous rather than phytophagous.

*Hyperdiplosis banksi* sp. nov.

*Female*.—Length, 1.75 millimeters. Antennæ probably nearly as long as body, dark brown, thickly haired; probably 14 segments, fifth with a stem about three-fourths the length of cylindrical basal enlargement, which has a length about twice its diameter, a sparse whorl of stout setæ basad and a similar whorl subapicad. First segment of palpi subquadrate; second long, irregular; third a little longer than second, slenderer; fourth a little longer than third, somewhat dilated. Eyes black. Mesonotum brownish yellow, the submedian lines a little lighter. Scutellum yellowish. Postscutellum reddish brown. Abdomen

a darker reddish brown, sparsely haired. Wings hyaline with a yellowish cast. Costa yellowish brown. Halteres yellowish, transparent. Coxæ reddish yellow. Femora, tibiæ, and basal tarsal segments mostly dark brown, distal tarsal segments lighter. Claws moderately long, strongly curved at nearly right angles, swollen distad, simple; pulvilli a little shorter than claws. Ovipositor short, terminal lobes with a length over four times the width, irregularly rounded apicad and sparsely clothed with long setæ.

*Type*.—Cecid. a2846, New York State collection.

LUZON, Laguna, Los Baños Falls, near Los Baños, 1917, College of Agriculture accession No. 18306 (*Uichanco*), reared from leaf galls on *Cissus adnata* Wall. var. The insect is somewhat larger than the species heretofore referred to this genus, and it is possible that on discovering the male it may be necessary to place this species elsewhere.

*Hyperdiplosis relicta* sp. nov.

*Female*.—Length, 1.5 millimeters. Antennæ about half the length of body, light brown, thickly haired; ? 14 segments, fifth with a stem three-fourths length of cylindric basal enlargement, which has a length about two and one-half times its diameter. Mouthparts somewhat produced, with a length about one-fourth the vertical diameter of head. First segment of palpi presumably short, irregular; second with a length about three times its diameter; third a little longer, slenderer; fourth as long as third, somewhat dilated. Mesonotum reddish brown. Scutellum and postscutellum a little lighter, rather thickly haired. Abdomen yellowish brown, thickly haired. Wings hyaline, third vein uniting with costa beyond apex of wing, fifth joining posterior margin at distal third, its branch at basal third. Halteres whitish, transparent. Coxæ yellowish brown. Legs mostly fuscous straw. Claws moderately long, slender basad, curved almost at right angles, distal portion distinctly swollen and tapering gradually to an acute, slightly recurved apex. Pulvilli about three-fourths the length of basal portion of claw. Ovipositor short, lobes narrowly oval, tapering slightly distad and rather thickly clothed with long setæ.

*Type*.—Cecid. a2841, New York State collection; paratype, No. 16015, College of Agriculture, Los Baños.

LUZON, Manila, 1911, Bureau of Science accession No. 16015 (*C. R. Jones*); the food plant is not recorded. The claws, in particular, are quite different from those of *H. banksi* Felt.

## KEYS TO THE SUBFAMILIES, TRIBES, AND GENERA OF THE ITONIDIDÆ

## ITONIDIDÆ

*Key to the subfamilies and the tribes.*

- a*<sup>1</sup>. Metatarsus longer than the following segment; 5 tarsal segments; wings with at least 4 long veins; cross vein usually present.  
     Subfamily Lestremiinae, p. 296.
- b*<sup>1</sup>. Fourth vein forked..... Tribe Lestremiariæ, p. 296.
- b*<sup>2</sup>. Fourth vein simple..... Tribe Campylomyzariæ, p. 297.
- a*<sup>2</sup>. Metatarsus longer or shorter than the following segment; wings with not more than 3 long veins; cross vein and circumfila wanting.  
     Subfamily Heteropezinae, p. 299.
- a*<sup>3</sup>. Metatarsus always shorter than the following segments; wings with 3 or 4 long veins; circumfila present.... Subfamily Itonididinae, p. 300.
- b*<sup>1</sup>. A distinct cross vein uniting the third vein and subcosta and usually parallel with costa..... Tribe Porricondylariæ, p. 300.
- b*<sup>2</sup>. No distinct cross vein uniting the third vein with subcosta.
- c*<sup>1</sup>. Costa thickly scaled; the third vein usually very close to the anterior margins of the wings; antennal segments sessile, cylindric, short, never produced..... Tribe Lasiopterariæ, p. 302.
- c*<sup>2</sup>. Costa rarely thickly clothed with scales, the third vein well separated therefrom; antennal segments usually with a length greater than their diameter.
- d*<sup>1</sup>. Flagellate antennal segments cylindric, never binodose in the male.
- e*<sup>1</sup>. Claws toothed..... Tribe Dasyneuriariæ, p. 303.
- e*<sup>2</sup>. Claws simple.
- f*<sup>1</sup>. Flagellate antennal segments cylindric or subcylindric, not greatly elongated, usually stalked in the male; ovipositor not aciculate..... Tribe Oligotrophariæ, p. 305.
- f*<sup>2</sup>. Flagellate antennal segments cylindric, elongate, sessile; ovipositor usually aciculate.... Tribe Asphondyliariæ, p. 308.
- d*<sup>2</sup>. Flagellate antennal segments of the male greatly produced, binodose; circumfila usually forming long loops.  
             Tribe Itonididinae, p. 309.

## LESTREMIINÆ

## LESTREMIINARIÆ

*Key to the genera.\**

- a*<sup>1</sup>. Antennæ at least moderately developed, with 11 to 16 segments, the second not greatly enlarged.
- b*<sup>1</sup>. Costa continuous and extending beyond the apex of the wing.  
         Catocha Hal.
- b*<sup>2</sup>. Costa not attaining the apex of the wing, practically disappearing at its union with the third vein..... Lestremia Macq.
- a*<sup>2</sup>. Antennæ greatly reduced, only 8 to 10 or 11 segments.
- b*<sup>1</sup>. Second antennal segment greatly enlarged; flagellate segments very short.

\* Revised from *Bull. N. Y. State Mus.* (1913), No. 165, 129.

- c<sup>1</sup>. Subcosta and third vein distinctly united as though by a very short cross vein. The fork formed by the two branches of the fourth vein even..... Microcerata Felt.
- c<sup>2</sup>. Subcosta and third vein not fused and with no trace of a cross vein.
- d<sup>1</sup>. Fork of the fourth vein with the two branches even.  
Konisomyia Felt.
- d<sup>2</sup>. Fork of the fourth vein with the branches irregular.  
Tritozyga H. Lw.
- b<sup>2</sup>. Second antennal segment normal. \*
- c<sup>1</sup>. Flagellate segments not greatly reduced..... Neptunimya Felt.
- c<sup>2</sup>. Flagellate segments sessile, with a length only a little greater than the diameter..... Neocatocha Felt.

## CAMPYLOMYZARIÆ

*Key to the genera.\**

- a<sup>1</sup>. Wingless or, if wings are present, the fifth vein simple.
- b<sup>1</sup>. Claws with long, parallel teeth, the pulvilli very short.  
Strobliaella Kieff.
- b<sup>2</sup>. Claws denticulate, the pulvilli absent..... Wasmanniella Kieff.
- b<sup>3</sup>. Claws simple..... Pezomyia Kieff.
- a<sup>2</sup>. Winged, fifth vein forked.
- b<sup>1</sup>. Third vein usually well separated from costa and frequently uniting therewith at or beyond the apex.
- c<sup>1</sup>. Flagellate antennal segments globose, stemmed in both sexes and ornamented only with whorls of long hairs.
- d<sup>1</sup>. Fourth vein present.
- e<sup>1</sup>. Palpi tri- or quadriarticulate.
- f<sup>1</sup>. Wings normal, slender, antennal segments, male 14, female 11.  
Joannisia Kieff.
- f<sup>2</sup>. Wings broad, not twice as long as wide, antennal segments, female 12..... Projoannisia Kieff.
- e<sup>2</sup>. Palpi biarticulate, the male with 14 and the female with 13 antennal segments, the claws strongly bent, dilated subapically..... Peromyia Kieff.
- d<sup>2</sup>. Fourth vein wanting.
- e<sup>1</sup>. Antennal segments stemmed..... Trichopteromyia Will.
- e<sup>2</sup>. Antennal segments sessile, the second enlarged, globose; palpi triarticulate..... Ceratomyia Felt.
- c<sup>2</sup>. Flagellate antennal segments with the enlargement transverse and bearing a whorl of stemmed disks..... Xylopriona Kieff.
- c<sup>3</sup>. Flagellate antennal segments cylindric, subsessile.
- d<sup>1</sup>. Male with 12, female with 9 antennal segments, fourth vein rudimentary, obsolete distad..... Mycophila Felt.
- d<sup>2</sup>. Female with 18 segments, the enlargements of the flagellate segments with a whorl of 4 awl-shaped appendages.  
Tetraxyphus Kieff.

\* Revised from *Bull. N. Y. State Mus.* (1913), No. 165, 154, 55.

- b*<sup>2</sup>. Third vein rarely extending to the apex of the wing; flagellate antennal segments subsessile in the female, ornamented with crenulate whorls or other structures more complex than irregular whorls of simple hairs.
- c*<sup>1</sup>. Palpi triarticulate.
- d*<sup>1</sup>. Wings wanting, reduced or normal; antennæ with 14 or 15 segments, the enlargements with stemmed disks.  
Pezomyia Kieff.
- c*<sup>2</sup>. Palpi quadriarticulate, as a rule.
- d*<sup>1</sup>. Antennæ very short, the male with 10 to 11; the female with 6 to 8 subsessile segments, the second greatly enlarged.  
Micromyia Rond.
- d*<sup>2</sup>. Antennæ not very short, the male with 14, the female with 11 to 22 antennal segments, the second not greatly enlarged.  
Campylomyza Meign.\*
- e*<sup>1</sup>. Flagellate antennal segments with a more or less distinct collar subapical, forming a more or less cup-shaped cavity.
- f*<sup>1</sup>. Claws denticulate, the pulvilli well developed.  
Prionellus Kieff.
- f*<sup>2</sup>. Claws arched, enlarged slightly subapical and with transverse striations; the pulvilli about half the length of the claws..... Prosaprius Kieff.
- f*<sup>3</sup>. Claws simple.
- g*<sup>1</sup>. Pulvilli short or rudimentary..... Aprionus Kieff.
- g*<sup>2</sup>. Pulvilli as long as the claws.
- h*<sup>1</sup>. Ovipositor large, covered with long hairs, with two divergent lobes and a small lobe basad.  
Urosema Kieff.
- h*<sup>2</sup>. Ovipositor not as above, triarticulate.  
Cylophora Kieff.
- e*<sup>2</sup>. Flagellate antennal segments with a subapical whorl of stemmed disks.
- f*<sup>1</sup>. Claws with a minute subapical tooth..... Monardia Kieff.
- f*<sup>2</sup>. Claws simple, a little shorter than the pulvilli.  
Amblyspatha Kieff.
- e*<sup>3</sup>. Flagellate antennal segments with reniform processes subapical, claws bent at right angles, dilated subapical.  
Bryomyia Kieff.
- e*<sup>4</sup>. Flagellate antennal segments with subapical whorls of short, stout, usually recurved spines..... Cordylomia Felt.
- e*<sup>5</sup>. Flagellate antennal segments with series of whorls of short, stout, curved spines..... Corinthomyia Felt.

\* This genus is insufficiently defined and as here stated is practically of supergeneric value.

## HETEROPEZINÆ

## Key to the genera.\*

- $a^1$ . Metatarsus longer than the second segment.  
 $b^1$ . Tarsi quadriarticulate.  
 $c^1$ . Three long veins.  
 $d^1$ . Palpi quadriarticulate (in amber)..... *Meunieria* Kieff.†  
 $d^2$ . Palpi triarticulate..... *Palæospaniocera* Meun.  
 $d^3$ . Palpi biarticulate..... *Miastor* Mein.  
 $d^4$ . Palpi uniarticulate..... *Peromiastor* Kieff.  
 $c^2$ . One long vein, wings very narrow..... *Neostenoptera* Meun.  
 $b^2$ . Tarsi triarticulate, 2 long veins.  
 $c^1$ . Antennal segments cylindric..... *Heteropeza* Winn.‡  
 $c^2$ . Antennal segments globose (in amber)..... *Monodicrana* H. Lw.‡  
 $a^2$ . Metatarsus shorter than the second segment.  
 $b^1$ . Tarsi quinquarticulate.  
 $c^1$ . Wing membrane finely haired.  
 $d^1$ . Third vein extending to the apex of the wing.  
 $e^1$ . Palpi quadriarticulate.  
 $f^1$ . Fifth vein forked..... *Haplusia* Karsch.  
 $f^2$ . Fifth vein simple..... *Johnsonomyia* Felt.§  
 $e^2$ . Palpi triarticulate, wings acuminate..... *Meinertomyia* Felt.  
 $e^3$ . Palpi uniarticulate, wings acute apically..... *Leptosyna* Kieff.  
 $d^2$ . Third vein not extending to the apex of the wing.  
 $e^1$ . Palpi biarticulate..... *Frirenia* Kieff.  
 $e^2$ . Palpi triarticulate..... *Epimyia* Felt.  
 $c^2$ . Wing membrane scaled.  
 $d^1$ . Fifth vein forked, palpi quadriarticulate (in amber).  
*Ledomyiella* Meun.  
 $d^2$ . Fifth vein simple.  
 $e^1$ . Four simple long veins, palpi biarticulate, antennal segments  
stemmed in the female..... *Kronomyia* Felt.  
 $e^2$ . Three simple long veins, palpi triarticulate.  
*Brachyneura* Rond. (*Spaniocera* Winn.).  
 $b^2$ . Tarsi biarticulate..... *Oligarces* Mein.

\* Revised from *Bull. N. Y. State Mus.* (1913), No. 165, 204.

† Location provisional.

‡ Kunstler and Chaine [*Compt. Rend. Soc. Biol.* (1902), 54, 535], give the characters of a form reared from bananas as follows: Tarsi biarticulate, the first segment longer than the second; wings with two or three long veins, the first two branched; palpi quadriarticulate. It was referred to the *Heteropezinæ* though no name was proposed and is presumably related to *Heteropeza* Winn. and *Monodicrana* H. Lw.

§ The Australian *Necrophlebia* Skuse and *Chastomera* Skuse are apparently closely related to this American genus and are provisionally associated therewith.

## ITONIDIDINÆ

## PORRICONDYLARIÆ

## Key to the genera.\*

- a*<sup>1</sup>. Cross vein not parallel with costa, forming a well-marked angle therewith.
- b*<sup>1</sup>. Four long veins, the fifth simple, the sixth free.
- c*<sup>1</sup>. Fifth vein arising from the third near the cross vein, a supernumerary vein at the basal third of subcosta..... *Diallactes* Kieff.
- c*<sup>2</sup>. Fifth vein arising from the base of the wing, no supernumerary vein at the basal third of subcosta.
- d*<sup>1</sup>. Fifth vein well developed; circumfila modified to form horseshoe-like appendages on opposite faces of the segment.  
(Syn. *Winnertziola* Kieff.)
- d*<sup>2</sup>. Fifth vein rudimentary, obsolete basad and apicad (Australian).  
*Gonioclema* Skuse.†
- b*<sup>2</sup>. Three long veins, the sixth a branch of the fifth or wanting.
- c*<sup>1</sup>. Wings not very long and narrow, the cross vein at an oblique angle to costa.
- d*<sup>1</sup>. Fifth vein forked, the sixth a branch of the fifth.
- e*<sup>1</sup>. Fifth vein close to the posterior margin and uniting therewith near the basal half; palpi triarticulate; terminal clasp segment short..... *Bryocrypta* Kieff.
- e*<sup>2</sup>. Fifth vein not close to the posterior margin, uniting therewith near the distal fourth; palpi quadriarticulate.
- f*<sup>1</sup>. No supernumerary vein at base of subcosta; claws toothed; terminal clasp segment greatly produced, slender.  
*Didactylomyia* Felt.
- f*<sup>2</sup>. Supernumerary vein at base of subcosta; claws simple.  
*Liebliola* Kieff. and Jorg.
- d*<sup>2</sup>. Fifth vein simple, the sixth wanting.
- e*<sup>1</sup>. Palpi quadriarticulate..... *Johnsonomyia* Felt.‡
- e*<sup>2</sup>. Palpi biarticulate..... *Colomyia* Kieff.
- c*<sup>2</sup>. Wings usually very long, narrow, the cross vein almost at right angles to costa.
- d*<sup>1</sup>. Fifth vein forked, the sixth a branch of the fifth; terminal clasp segment short, swollen, the claws usually simple.  
*Colpodia* Winn.
- d*<sup>2</sup>. Fifth vein simple, not reaching the wing margin.  
*Clinophæna* Kieff.
- d*<sup>3</sup>. Fifth vein simple, the sixth wanting (fossil).  
*Palæocolpodia* Meun.
- a*<sup>2</sup>. Cross vein parallel or nearly so with costa and apparently a continuation of the third vein.

\* Revised from *Bull. N. Y. State Mus.* (1915), No. 180, 128-30.

† Location provisional.

‡ The absence of circumfila compels the reference of this genus to the *Heteropezinæ*, though the superficial wing and antennal structures would place it here. It has therefore been included in the key simply to facilitate identification.

- b*<sup>1</sup>. Four long veins, the fifth simple, the sixth free.
- c*<sup>1</sup>. Fifth vein not obsolete basad.
- d*<sup>1</sup>. Distal portion of the abdomen not recurved dorsad.
- e*<sup>1</sup>. Pulvilli longer than the unidentate claws; 16 or more antennal segments; ovipositor biarticulate..... *Asynapta* H. Lw.
- e*<sup>2</sup>. Pulvilli shorter than the simple claws; 14 antennal segments; ovipositor triarticulate..... *Clinorhysis* Kieff.
- d*<sup>2</sup>. Abdomen slender, the distal portion recurved dorsally; claws toothed, the lobes of the ovipositor biarticulate.  
*Rübsaamenia* Kieff.
- c*<sup>2</sup>. Fifth vein obsolete basally; abdomen greatly produced, at least three times the length of the remainder of the body.  
*Dicerura* Kieff.
- b*<sup>2</sup>. Three long veins, the sixth a branch of the fifth or wanting.
- c*<sup>1</sup>. Fifth vein forked.
- d*<sup>1</sup>. Circumfila of the male not forming long loops or bows as in the *Itonidinariae*.
- e*<sup>1</sup>. Palpi quadriarticulate.
- f*<sup>1</sup>. Antennal segments of the male greatly produced, or at least with a distinct stem.
- g*<sup>1</sup>. Abdomen not recurved dorsad.
- h*<sup>1</sup>. Claws simple.
- i*<sup>1</sup>. Pulvilli as long as or a little shorter than the claws.
- j*<sup>1</sup>. Flagellate antennal segments of the male globose, elongated and constricted in the middle in the female..... *Porricondyla* Rond.
- j*<sup>2</sup>. Flagellate antennal segments elongated and subcylindrical in the two sexes..... *Phænepidosia* Kieff.
- i*<sup>2</sup>. Pulvilli rudimentary.
- j*<sup>1</sup>. Flagellate antennal segments of the female with a stem one-half to three-fourths the length of the enlargement; lobes of ovipositor biarticulate.  
*Parepidosis* Kieff.
- j*<sup>2</sup>. Flagellate antennal segments of the female sessile; lobes of the ovipositor very small.  
*Mysocosmus* Kieff.
- h*<sup>2</sup>. Claws toothed.
- i*<sup>1</sup>. Pulvilli as long as the claws.
- j*<sup>1</sup>. Terminal clasp segment as long as the basal clasp segment, capitate apicad..... *Dicroneurus* Kieff.
- j*<sup>2</sup>. Terminal clasp segment ellipsoidal, shorter than the basal clasp segment..... *Synaptella* Kieff.
- i*<sup>2</sup>. Pulvilli reaching at most to the middle of the claws.
- j*<sup>1</sup>. Third and fourth antennal segments fused.  
*Synarthrella* Kieff.
- j*<sup>2</sup>. Third and fourth antennal segments not fused; terminal clasp segment a little longer than its diameter, almost truncate, the margin spined.  
*Prosepidosis* Kieff.
- i*<sup>2</sup>. Pulvilli rudimentary.
- j*<sup>1</sup>. Claws strongly curved, almost at right angles, the teeth equally long.... *Tetradiplosis* Kieff. and Jörg.

- $g^2$ . Abdomen slender, recurved dorsad..... *Camptomyia* Kieff.  
 $f^2$ . Antennal segment not greatly produced in both sexes.  
 $g^1$ . Basal clasp segment ovate, denticulate apicad; terminal  
 clasp segment wanting..... *Dirhiza* H. Lw.  
 $g^2$ . Male genitalia presumably normal; flagellate antennal  
 segments subsessile or nearly so; lobes of the ovipositor  
 normal..... *Prodirhiza* Kieff.  
 $e^2$ . Palpi triarticulate..... *Lopesiella* Tav.  
 $d^2$ . Circumfila of the male forming long loops as in the *Itonidinaræ*.  
 $e^1$ . Palpi quadriarticulate..... *Lopesia* Rübs.  
 $e^2$ . Palpi uniarticulate..... *Allodiplosis* Kieff. and Jörg.  
 $c^2$ . Fifth vein simple, the sixth wanting.  
 $d^1$ . Claws denticulate, as long as the pulvilli or at most twice as  
 long as the pulvilli..... *Holoneurus* Kieff.  
 $d^2$ . Claws toothed, more than twice the length of the pulvilli.  
*Coccopsis* Meij.

## LASIOPTERIARIÆ

## Key to the genera.

- $a^1$ . Third vein very near costa and uniting therewith at or before the basal  
 half, very rarely near the distal third.  
 $b^1$ . Mouth parts and thorax normal; that is, not greatly prolonged.  
 $c^1$ . Palpi with three or four segments.  
 $d^1$ . Third and fourth antennal segments coalescent or closely fused;  
 pulvilli always well developed.  
 $e^1$ . Three long veins, the fifth forked some distance from its base.  
 $f^1$ . Ventral plate bilobed; palpi usually quadriarticulate.  
*Lasioptera* Meig.\*  
 $f^2$ . Ventral plate straight, not emarginate; palpi triarticulate.  
*Prolasioptera* Kieff.  
 $e^2$ . Four simple long veins..... *Neolasioptera* Felt.  
 $d^2$ . Third and fourth antennal segments not coalescent, at least  
 separated by a distinct constriction; pulvilli sometimes small  
 or rudimentary.  
 $e^1$ . Palpi quadriarticulate; claws simple..... *Protaplonyx* Felt.  
 $c^2$ . Palpi biarticulate or uniarticulate.  
 $d^1$ . Third and fourth antennal segments coalescent or closely fused;  
 pulvilli always well developed.  
 $e^1$ . Palpi uni- or biarticulate, rarely triarticulate... *Asteromyia* Felt.  
 $d^2$ . Third and fourth antennal segments not coalescent, at least  
 separated by a distinct constriction; pulvilli sometimes small or  
 rudimentary.  
 $e^1$ . Palpi biarticulate, claws toothed or simple; terminal lobe of  
 the ovipositor rounded, dorsally with a chitinous barbed  
 process..... *Stefaniella* Kieff.

\* Kieffer has proposed the name *Meunieriella* for species of *Lasioptera* without the dorsal group of hooks on the ovipositor. This, if adopted, would mean placing a considerable number of American forms now referred to *Lasioptera* into this new genus.

- e*<sup>2</sup>. Palpi uniarticulate.  
*f*<sup>1</sup>. Mouth parts produced.  
*g*<sup>1</sup>. Claws distinctly toothed.  
*h*<sup>1</sup>. Ovipositor with a group of hooks on the basal half.  
Baldratia Kieff.  
*h*<sup>2</sup>. Ovipositor without hooks but with produced chitinous  
pectinate appendages, lobes broad..... Baldratiella Kieff.  
*g*<sup>2</sup>. A very small basal tooth on the claws; ovipositor stout,  
curved, the distal portion slender, almost aciculate.  
Baldratiola Kieff.  
*f*<sup>2</sup>. Mouth parts not produced, normal; claws simple.  
*g*<sup>1</sup>. Ovipositor aciculate..... Aplonyx Perez.  
*g*<sup>2</sup>. Ovipositor with two diverging lobes..... Dibaldratia Kieff.  
*g*<sup>3</sup>. Ovipositor obliquely truncate distad, with a row of hooks  
dorsad; head very small, well under the mesonotum.  
Stefaniola Kieff.  
*b*<sup>2</sup>. Mouth parts and thorax prolonged; antennal segments 10 to 13.  
*c*<sup>1</sup>. Three long veins, the fifth forked..... Clinorrhyncha Loew.  
*c*<sup>2</sup>. Four long veins, the fifth simple..... Ozirrhynechus Rond.  
*a*<sup>2</sup>. Third vein distinctly separated from costa and uniting therewith beyond  
the basal half.  
*b*<sup>1</sup>. First antennal segment normal; not strongly produced; third vein  
strongly arched, it and the body not thickly clothed with scales.  
Camptoneuromyia Felt.  
*b*<sup>2</sup>. First antennal segment produced, with a length about three times  
its diameter, the third vein and the body thickly clothed with shin-  
ing, frequently silvery, scales; ovipositor aciculate... Trotteria Kieff.

## DASYNEURIARIÆ

*Key to the genera.*

- a*<sup>1</sup>. Palpi quadriarticulate.  
*b*<sup>1</sup>. Antennæ usually with 14 or more segments.  
*c*<sup>1</sup>. Third vein uniting with the margin well beyond the apex of the  
wing.  
*d*<sup>1</sup>. Fifteen antennal segments; wings hyaline; the ovipositor short.  
*e*<sup>1</sup>. Claws normal, not strongly bent..... Baomyza Kieff.  
*e*<sup>2</sup>. Claws bent almost at right angles, pulvilli rudimentary.  
Stomatosema Kieff.  
*d*<sup>2</sup>. Thirteen antennal segments; wings spotted; pulvilli almost half  
the length of the claws..... Hallomyia Kieff.  
*c*<sup>2</sup>. Third vein uniting with costa near or at the apex of the wing.  
*d*<sup>1</sup>. Costa without scales.  
*e*<sup>1</sup>. Antennæ with 14 to more than 20 segments, usually with 18  
or more.  
*f*<sup>1</sup>. Third vein slightly curved, 19 antennal segments, the ovi-  
positor short, the lobes orbicular..... Promikiola Kieff.  
*f*<sup>2</sup>. Third vein nearly straight, the ovipositor usually produced.  
*g*<sup>1</sup>. Ovipositor not chitinized apicad.  
*h*<sup>1</sup>. Claws plainly unidentate, the tooth heavily chitinized.  
Rhabdophaga Westw.  
*h*<sup>2</sup>. Claws with a slightly chitinized trifid tooth.  
Chortomyia Kieff.

- g*<sup>2</sup>. Ovipositor chitinized apicad, bladelike, the claws weakly toothed..... *Procystiphora* Felt.
- d*<sup>7</sup>. Costa scaled.
- e*<sup>1</sup>. Antennæ with 16 segments, claws shorter than the pulvilli, the ovipositor long..... *Riverælla* Kieff.
- e*<sup>2</sup>. Antennæ with 18 segments, claws longer than the pulvilli.  
*Trichoperrisia* Kieff.
- e*<sup>3</sup>. Antennæ with 21 cylindrical segments, the legs scaled, the claws shorter than the pulvilli..... *Xyloperrisia* Kieff.
- e*<sup>4</sup>. Antennæ with 22 ovoid segments in the male, cylindrical in the female, claws shorter than the pulvilli.  
*Pernettyella* Kieff.
- c*<sup>3</sup>. Third vein uniting with costa well before the apex of the wing, straight or curved cephalad and tapering but little.
- d*<sup>7</sup>. Claws of the anterior legs toothed, those of the mid and posterior legs simple.
- e*<sup>1</sup>. Costa scaled, antennal segments 14, ovipositor short.  
*Phænolauthia* Kieff.
- d*<sup>7</sup>. Claws on all legs toothed.
- e*<sup>1</sup>. Wing veins distinctly scaled, the membrane more or less fuscous.
- f*<sup>1</sup>. Body sparsely scaled, 14 cylindrical segments, the circumfila produced irregularly in certain males.... *Lasiopteryx* Steph.
- f*<sup>2</sup>. Body scaled.
- g*<sup>1</sup>. Claws of anterior legs, at least, toothed, more than twice the length of the pulvilli; 14 cylindrical antennal segments; ovipositor short..... *Lauthia* Kieff.
- g*<sup>2</sup>. Claws of all the legs toothed, pulvilli rudimentary, ovipositor short..... *Cryptolauthia* Kieff.
- e*<sup>2</sup>. Wing veins not distinctly scaled, the membrane hyaline.
- f*<sup>1</sup>. Fifth vein forked, the female ovipositor long, sometimes longer than the body, circumfila not greatly produced.  
*Dasyneura* Rond. (*Microperrisia* Kieff.).
- f*<sup>2</sup>. Fifth vein simple, antennæ with 12 segments, the one circumfilum below the middle of the segment; pulvilli very small ..... *Prowinnertzia* Kieff.
- b*<sup>2</sup>. Antennæ with 10 to 12 or 13, rarely with 14 segments.
- c*<sup>1</sup>. Thorax and abdomen plainly covered with scales; antennæ with 10 to 12 segments.
- d*<sup>7</sup>. All the claws toothed; ovipositor long.
- e*<sup>1</sup>. Twelve subglobular antennal segments. *Sphærolauthia* Kieff.
- e*<sup>2</sup>. Ten to 12 subcylindrical antennal segments; ovipositor greatly produced..... *Ledomyia* Kieff.
- d*<sup>2</sup>. Claws of the anterior legs toothed, those of the mid and posterior legs simple, fifth vein simple, ovipositor short.  
*Brachyneurella* Kieff.
- c*<sup>2</sup>. Thorax and abdomen not plainly covered with scales.
- d*<sup>1</sup>. Third vein uniting with costa near the apex of the wing.
- e*<sup>1</sup>. Antennæ with 13 or 14 segments; terminal clasp segment of the male short, swollen; ovipositor subglobose, spined apically.  
*Cystiphora* Kieff.
- e*<sup>2</sup>. Antennæ with 13 or 14 segments; claws as long as the pulvilli; terminal clasp segment large..... *Geocrypta* Kieff.

- e*<sup>3</sup>. Antennæ with 12 segments, the flagellate ones sessile in both sexes.  
*f*<sup>1</sup>. Terminal clasp segment large, greatly swollen. *Macrolabis* Kieff.  
*f*<sup>2</sup>. Terminal clasp segment normal.  
*g*<sup>1</sup>. Harpes not sickle-shaped or greatly produced. *Arnoldia* Kieff.  
*g*<sup>2</sup>. Harpes sickle-shaped, greatly produced.... *Harpomyia* Felt.  
*d*<sup>2</sup>. Third vein uniting with costa well before the apex of the wing.  
*e*<sup>1</sup>. Antennæ with 12 segments.  
*f*<sup>1</sup>. Third vein strongly curved, uniting with costa at the distal fourth; flagellate antennal segments of the male stemmed. *Neuromyia* Felt.  
*a*<sup>2</sup>. Palpi triarticulate.  
*b*<sup>1</sup>. Claws unidentate; rarely bidentate.  
*c*<sup>1</sup>. Antennæ with 16 to 18 segments, the flagellate ones stemmed in the male, sessile in the female, claws shorter than the pulvilli; male genitalia not unusual..... *Dryomyia* Kieff.  
*c*<sup>2</sup>. Antennæ with 18 segments, the flagellate ones sessile, the claws with a length one-half that of the pulvilli, terminal clasp segment very large..... *Calopedila* Kieff.  
*c*<sup>3</sup>. Antennal segments 15, costa haired, legs scaled, ovipositor long. *Spartiomyia* Kieff.  
*c*<sup>4</sup>. Antennæ with 12 segments, terminal clasp segment slender, the dorsal and ventral plates deeply emarginate..... *Rhizomyia* Kieff.  
*b*<sup>2</sup>. Claws pectinate.  
*c*<sup>1</sup>. Antennæ with 14 segments, the terminal clasp segment long, stout, the ovipositor short, the lobes broadly oval. *Ctenodactylomyia* Felt.  
*a*<sup>3</sup>. Palpi biarticulate.  
*b*<sup>1</sup>. Antennal segments 14 to 18, the flagellate ones usually stemmed in both sexes..... *Diarthronomyia* Felt.  
*b*<sup>2</sup>. Antennal segments 12, the flagellate ones in the male stemmed. *Coccidomyia* Felt.  
*a*<sup>4</sup>. Palpi uniarticulate.  
*b*<sup>1</sup>. Antennal segments 20, the flagellate ones stemmed in the male, sessile in the female, circumfila recticulate, the unidentate claws shorter than the pulvilli..... *Scheuria* Kieff.  
*b*<sup>2</sup>. Antennal segments 16 in the male, 18 in the female, the flagellate ones in the male stemmed, the trifid claws longer than the pulvilli. *Guarephila* Tav.

## OLIGOTROPHIARIÆ

*Key to the genera \**

- a*<sup>1</sup>. Palpi quadriarticulate.  
*b*<sup>1</sup>. Third vein uniting with the margin well before the apex.  
*c*<sup>1</sup>. Antennæ with 10 segments in the male, 9 in the female; claws very slender, curved almost at right angles; pulvilli rudimentary. *Properrisia* Kieff.  
*c*<sup>2</sup>. Antennæ with 14 or more segments.

\* Revised from Kieffer.

- d*<sup>2</sup>. Terminal clasp segment moderately large, pubescent, gradually tapering; ovipositor long, cylindric..... *Janetiella* Kieff.
- d*<sup>2</sup>. Terminal clasp segment large, elongate-ellipsoidal, the dorsal and ventral plates bilobed; ovipositor protractile.  
*Zygiobia* Kieff.
- c*<sup>3</sup>. Antennæ with 13 segments.
- d*<sup>1</sup>. Female having the stems of the flagellate segments with a length two-thirds that of the segment, the terminal clasp segment slender..... *Nanolauthia* Kieff.
- b*<sup>2</sup>. Third vein uniting with the margin at or very near the apex.
- c*<sup>1</sup>. Antennæ with 14 segments, the genitalia and ovipositor about as in *Dasyneura*..... *Phytophaga* Rond.
- c*<sup>2</sup>. Antennæ with 16 to 20 segments.
- d*<sup>1</sup>. Third and fourth antennal segments not fused.
- e*<sup>1</sup>. Antennal segments in the male with a stem about two-thirds the length of the segment; terminal clasp segment rather slender, long, tapering gradually..... *Phegomyia* Kieff.
- e*<sup>2</sup>. Stem of the flagellate antennal segment as long as the basal enlargement, otherwise as in the preceding.  
*Cranciobia* Kieff.
- d*<sup>2</sup>. Third and fourth antennal segments fused; antennæ with 18 or 19 segments, the stem of the flagellate segments with a length one-half to two-thirds that of the segment; terminal clasp segment slightly enlarged, gradually tapering, the dorsal and ventral plates deeply bilobed..... *Phegobia* Kieff.
- c*<sup>3</sup>. Antennæ with 20 to 24 segments.
- d*<sup>1</sup>. Antennal segments of male stemmed, those of female sessile; dorsal and ventral plates emarginate; ovipositor short, lobed.  
*Mikiola* Kieff.
- a*<sup>2</sup>. Palpi triarticulate.
- b*<sup>1</sup>. Ovipositor distinctly chitinized.
- c*<sup>1</sup>. Ovipositor aciculate or cultriform; antennal segments 12 to 24.  
*Sackenomyia* Felt.
- c*<sup>2</sup>. Ovipositor short, with a rounded, chitinized terminal plate; antennal segments 13..... *Phlyctidobia* Kieff.
- b*<sup>2</sup>. Ovipositor not chitinized.
- c*<sup>1</sup>. Terminal clasp segment of male subapical, the basal clasp segment with a broad, apical lobe..... *Luzonomyia* g. nov.
- c*<sup>2</sup>. Terminal clasp segment of male apical.
- d*<sup>1</sup>. Ovipositor almost truncate apically, without a distinct pocket; terminal clasp segment not large, the empodium twice as long as the claws, the third and fourth antennal segments not fused.  
*Oligotrophus* Latr.
- c*<sup>3</sup>. Ovipositor with the terminal segment pocket-shaped, the empodium much longer or only a little longer than the claws.
- d*<sup>2</sup>. Intermediate whorl of the flagellate antennal segments in the male with two greatly produced hairs, the third and fourth antennal segments fused; terminal clasp segment very large, elongate, ellipsoidal..... *Mikomyia* Kieff.
- d*<sup>2</sup>. Whorls of the flagellate antennal segments otherwise.
- e*<sup>1</sup>. Basal clasp segment with a median, membranous, transparent prolongation attaining the tip of the ventral plate; terminal clasp segment large, pointed, ovoid.

- f*<sup>1</sup>. Ventral plate deeply bilobed, third and fourth antennal segments fused in the male, the enlargement of the third a little longer than that of the fourth..... *Semudobia* Kieff.
- f*<sup>2</sup>. Ventral plate entire, third and fourth segments not fused, the enlargement of the third twice as long as that of the fourth..... *Apiomyia* Kieff.
- e*<sup>2</sup>. Basal clasp segment otherwise.
- f*<sup>1</sup>. Stems of the flagellate antennal segments short in both sexes.
- g*<sup>1</sup>. Antennæ with 22 to 25 segments (palpi are given as bi- or triarticulate); costa, subcosta, and third vein scaled.  
*Uleia* Rübs.
- g*<sup>2</sup>. Antennæ with 17 segments, the flagellate segments with 5 or 6 slightly looped circumfila; wings with a supernumerary vein..... *Lyciomyia* Kieff. and Jörg.
- f*<sup>2</sup>. Stems of the flagellate antennal segments long in the male, very short or wanting in the female.
- g*<sup>1</sup>. Third and fourth antennal segments fused; terminal clasp segment not large, gradually constricted, the larva with a breastbone..... *Blastomyia* Kieff.
- g*<sup>2</sup>. Third and fourth antennal segments not fused; terminal clasp segment very large, swollen, the larva without a breastbone..... *Iteomyia* Kieff.
- a*<sup>2</sup>. Palpi bi- or uniarticulate.
- b*<sup>1</sup>. Ovipositor chitinized, cultriform or more or less aciculate.  
*Sackenomyia* Felt.
- b*<sup>2</sup>. Ovipositor not distinctly chitinized.
- c*<sup>1</sup>. Pulvilli nearly twice as long as the empodium.
- d*<sup>1</sup>. Palpi biarticulate..... *Psectrosema* Kieff.
- d*<sup>2</sup>. Palpi uniarticulate..... *Walshomyia* Felt.
- c*<sup>2</sup>. Pulvilli equal to the empodium; palpi uniarticulate.  
*Isosandalum* Kieff.
- c*<sup>3</sup>. Pulvilli distinctly shorter than the empodium.
- d*<sup>1</sup>. Empodium as long as or longer than the claws.
- e*<sup>1</sup>. Third flagellate antennal segment of the male large and with three circumfila, the other segments with two whorls.  
*Guignonia* Kieff.
- e*<sup>2</sup>. Third flagellate antennal segment not large and heavy and having no more circumfila than the others.
- f*<sup>1</sup>. Terminal clasp segment large, swollen, or only slightly constricted distad; ovipositor subcylindric, greatly protractile; terminal segment strongly constricted, pocket-shaped.
- g*<sup>1</sup>. Flagellate antennal segments with a long stem in both sexes; circumfila reticulate..... *Rhopalomyia* Rübs.
- g*<sup>2</sup>. Flagellate antennal segments sessile or subsessile in the female; circumfila not reticulate.
- d*<sup>2</sup>. Empodium twice as long the claws..... *Arc euthomyia* Kieff.
- d*<sup>3</sup>. Empodium not longer or only a little longer than the claws; palpi uniarticulate; larva without a breastbone.  
*Misospatha* Kieff.\*

\* *Panteliola* Kieff., according to Kieffer, is separated from *Misospatha* by the biarticulate palpi.

## ASPHONDYLIARIÆ

## Key to the genera.\*

- a*<sup>1</sup>. Ovipositor protractile, aciculate or nearly so, the terminal clasp segment of the male usually uni- or bidentate.
- b*<sup>1</sup>. Palpi quadriarticulate.
- c*<sup>1</sup>. Flagellate antennal segments with long whorled hairs and two strongly sinuous and anastomosing circumfila, especially in the male.
- d*<sup>1</sup>. Ovipositor aciculate, without lamellæ apicad; larval breastbone bidentate..... *Schizomyia* Kieff.
- d*<sup>2</sup>. Ovipositor subaciculate, with two very small lamellæ apicad; larval breastbone unidentate..... *Kiefferia* Mik.
- c*<sup>2</sup>. Flagellate antennal segments with short hairs, not whorled.
- d*<sup>1</sup>. Flagellate antennal segments sessile, without an appreciable stem.
- e*<sup>1</sup>. Claws much longer than the pulvilli; the basal segment of the ovipositor with rows of minute spinules.  
*Tetrasphondylia* Kieff.
- e*<sup>2</sup>. Claws as long as the pulvilli; the first segment of the ovipositor finely striate, without spinules.  
*Parasphondylia* Kieff.
- d*<sup>2</sup>. Flagellate antennal segments subsessile, with a stem about one-fourth the length of the basal enlargement; claws shorter than the pulvilli..... *Xenasphondylia* Felt.
- b*<sup>2</sup>. Palpi bi- or triarticulate, rarely uniarticulate.
- c*<sup>1</sup>. Third vein uniting with the margin near the apex of the wing.
- d*<sup>1</sup>. Circumfila in the female consisting of two comparatively simple bands.
- e*<sup>1</sup>. Terminal clasp segment of the male uni- or bidentate, not pectinate.
- f*<sup>1</sup>. Subcostal cell normal, not opaque, the ovipositor with a lobed pouch proximad, not vesiculate basad.  
*Asphondylia* H. Loew.  
(Syn. *Monasphondylia* Kieff.)
- f*<sup>2</sup>. Subcostal cell opaque, the ovipositor with a globose, striate basal enlargement..... *Bruggmanniella* Tav.
- e*<sup>2</sup>. Terminal clasp segment of the male pectinate.
- f*<sup>1</sup>. Terminal clasp segment apical; ovipositor subaciculate, with submedian groups of hairs on the distal segment.  
*Proasphondylia* Felt.
- f*<sup>2</sup>. Terminal clasp segment of the male subapical, the ovipositor probably as in *Schizomyia*..... *Bruggmannia* Tav.
- d*<sup>2</sup>. Circumfila in the female forming five irregular, anastomosing bands; ovipositor as in *Asphondylia*..... *Oxasphondylia* Felt.
- c*<sup>3</sup>. Third vein uniting with costa near the distal fourth.
- d*<sup>1</sup>. Palpi triarticulate, the circumfila low, very irregular, terminal clasp segment slender, unidentate, dorsal and ventral plates deeply emarginate..... *Acroëctasis* Rübs.
- b*<sup>3</sup>. Palpi uniarticulate.
- c*<sup>1</sup>. Terminal clasp segment of the male subapical, conical.  
*Houardiella* Kieff.

\* Revised from *Proc. U. S. Nat. Mus.* (1915), 48, 197, 98.

- c*<sup>2</sup>. Terminal clasp segment of the male bidentate.
- d*<sup>1</sup>. Subcostal cell remarkably broad, a rudimentary vein spur at the base of subcosta..... *Zalepidota* Rübs.
- d*<sup>2</sup>. Subcostal cell not remarkably broad, no rudimentary vein spur at the base of subcosta; terminal clasp segment with greatly produced, tapering spurs or horns..... *Diceromyia* gen. nov.
- a*<sup>3</sup>. Ovipositor exserted, apicad with lobes or triangular plates; terminal clasp segment of the male usually serrate apicad. . . . .
- b*<sup>1</sup>. Palpi quadriarticulate.
- c*<sup>1</sup>. Terminal clasp segment of the male subapical; third and fourth antennal segments not fused, the circumfila coarsely reticulate in the male, the pulvilli longer than the claws. . . . .  
*Polystepha* Kieff.
- c*<sup>2</sup>. Terminal clasp segment of the male apical; third and fourth antennal segments fused, the circumfila usually with many fine reticulations in the male, the pulvilli usually shorter than the claws..... *Cincticornia* Felt.
- b*<sup>2</sup>. Palpi triarticulate.
- c*<sup>1</sup>. Terminal clasp segment of the male serrate apicad.
- d*<sup>1</sup>. Circumfila of male coarse, very irregular, 4 or 5 transverse fila to a segment, the plates of the ovipositor triangular. . . . .  
*Feltomyia* Kieff.\*
- d*<sup>2</sup>. Circumfila of male fine, about 18 transverse fila to a segment, the terminal lobes of the ovipositor roundly quadrate. . . . .  
*Eocincticornia* Felt.
- c*<sup>3</sup>. Terminal clasp segment of the male bidentate, subapical, the ovipositor conical..... *Daphnephila* Kieff.
- b*<sup>3</sup>. Palpi uniarticulate; flagellate antennal segments subsessile; abdomen with caducous scales, the short ovipositor biarticulate. . . . .  
*Ozobia* Tav.

## ITONIDIDINARIÆ

*Skeleton key to the genera.*

## BIFILI

- a*<sup>1</sup>. Flagellate antennal segments of the male all binodose (p. 310).
- a*<sup>2</sup>. Some of the flagellate antennal segments of the male cylindrical (p. 311).

## TRIFILI

- a*<sup>1</sup>. Claws toothed on all the legs (p. 312).
- b*<sup>1</sup>. Palpi quadriarticulate (p. 312).
- b*<sup>2</sup>. Palpi triarticulate, uniarticulate (p. 314).
- a*<sup>2</sup>. Claws on the anterior legs (and sometimes middle legs) toothed (p. 315).
- b*<sup>1</sup>. Palpi quadriarticulate (p. 315).
- c*<sup>1</sup>. Circumfila greatly produced (p. 315).
- c*<sup>2</sup>. Circumfila regular (p. 315).
- b*<sup>3</sup>. Palpi triarticulate (p. 316).
- a*<sup>3</sup>. Claws all simple (p. 316).
- b*<sup>1</sup>. Palpi quadriarticulate (p. 316).

\* Judging from larval characters, this genus is closely related to and may possibly be a synonym of *Ulella* Rübsaamen.

- c<sup>1</sup>. Third vein before the apex (p. 316).
- c<sup>2</sup>. Third vein at the apex (p. 317).
- c<sup>3</sup>. Third vein beyond the apex (p. 317).
- d<sup>1</sup>. Circumfila irregular (p. 317).
- d<sup>2</sup>. Circumfila regular (p. 317).
- b<sup>2</sup>. Palpi triarticulate (p. 320).
- b<sup>3</sup>. Palpi biarticulate (p. 322).
- b<sup>4</sup>. Palpi uniarticulate (p. 323).

## ITONIDIDINARIÆ

## Key to the genera.

## BIFILI

- a<sup>1</sup>. Flagellate antennal segments of the male all binodose.
- b<sup>1</sup>. Palpi quadriarticulate.
  - c<sup>1</sup>. Claws on all legs toothed.
    - d<sup>1</sup>. Wings with greatly produced and broadly rounded areas posteriorly.
      - e<sup>1</sup>. Internal basal lobe of the basal clasp segment setose, the dorsal and ventral plates deeply emarginate, the lobes of the ventral plate very long, moderately narrow, the ovipositor very short, turned dorsad and not protractile.
 

Indodiplosis Felt.
      - e<sup>2</sup>. Internal basal lobe of the basal clasp segment smooth, the dorsal and ventral plates broadly and slightly emarginate, the ovipositor with a length one-half that of the abdomen, protractile.
 

Erosomyia Felt.
  - c<sup>2</sup>. Claws of anterior legs toothed.
    - d<sup>1</sup>. Wings normal, the posterior areas not greatly produced, the fifth antennal segment having the basal stem with a length about two and one-half times its diameter.
 

Toxomyia Felt.
  - c<sup>3</sup>. Claws all simple.
    - d<sup>1</sup>. Costa thickened basad to form a spindle-shaped enlargement.
      - e<sup>1</sup>. All of the flagellate antennal segments of the male binodose and with circumfila; ovipositor aciculate.
 

Löwodiplosis Kieff.
    - d<sup>2</sup>. Costa not thickened basad.
      - e<sup>1</sup>. Wings of the male with the posterior area greatly produced and broadly rounded.
        - f<sup>1</sup>. Stems of the flagellate antennal segments of the male short, with a length about one-half the diameter, the harpes not strongly chitinized.
 

Lobopteromyia Felt.
        - f<sup>2</sup>. Stems of the flagellate antennal segments of the male with a length over twice their diameter, the harpes strongly chitinized and convolute.
 

Streptodiplosis Felt.
      - e<sup>2</sup>. Wings narrow, with a length at least three times the width, the ovipositor greatly produced, chitinized.
 

Thuraia Rübs.
      - e<sup>3</sup>. Wings normal, neither specially broadened nor narrowed.
        - f<sup>1</sup>. Costa thickly clothed with scales, the third vein uniting with the margin before the apex of the wing.
          - g<sup>1</sup>. The first antennal segment with a dorsal tooth, the wing membrane with narrow scales.
 

Endaphis Kieff.

- g*<sup>2</sup>. The first antennal segment not toothed, the mesonotum with two lines of golden scales, the wings with smoky spots, iridescent..... *Lasiodiplosis* Kieff.
- f*<sup>2</sup>. Costa not scaled.
- g*<sup>3</sup>. Third vein uniting with the margin at the apex of the wing.
- h*<sup>1</sup>. Third vein interrupting the margin.
- i*<sup>1</sup>. Basal clasp segment not lobed; ovipositor long, slender; wings hyaline..... *Contarinia* Rond.
- i*<sup>2</sup>. As in *Contarinia*, except that the wings are spotted.  
*Stictodiplosis* Kieff.
- i*<sup>3</sup>. Basal clasp segment with a triangular lobe basally; ovipositor short and with a semicircular ventral piece..... *Procontarinia* Kieff. and Cec.
- h*<sup>2</sup>. Third vein not interrupting the margin at its union with costa.
- i*<sup>1</sup>. Ventral plate not longer than the dorsal, bilobed; terminal clasp segment large, pubescent; ovipositor long..... *Thecodiplosis* Kieff.
- i*<sup>2</sup>. Ventral plate linear, much longer than the dorsal, emarginate; terminal clasp segment slender, smooth; ovipositor slightly produced..... *Sitodiplosis* Kieff.
- g*<sup>2</sup>. Third vein uniting with the margin beyond the apex of the wing.
- h*<sup>1</sup>. Terminal clasp segment of the male short, thick, pubescent; fourteenth antennal segment of the female with a large conical appendage..... *Stephodiplosis* Tav.
- h*<sup>2</sup>. Terminal clasp segment moderately long, not pubescent; fourteenth antennal segment of the female without a conspicuous appendage..... *Syndiplosis* Rübs.
- α*<sup>2</sup>. Some flagellate antennal segments of the male cylindrical.
- b*<sup>1</sup>. Palpi quadriarticulate.
- c*<sup>1</sup>. All the flagellate antennal segments of the male cylindrical.
- d*<sup>1</sup>. Claws toothed, curved at almost right angles.
- e*<sup>1</sup>. Circumfila low; terminal clasp segment slender, the lobes of the dorsal plate rounded..... *Holobremia* Kieff.\*
- d*<sup>2</sup>. Claws simple.
- e*<sup>1</sup>. Ventral plate a little longer than the dorsal plate; terminal clasp segment short, plainly swollen near the middle.  
*Geisenheyneria* Rübs.\*
- e*<sup>2</sup>. Ventral plate linear, emarginate apically, much longer than the dorsal plate; terminal clasp segment slender.  
*Monodiplosis* Rübs.\*
- e*<sup>3</sup>. Dorsal plate divided, the lobes triangular; ventral plate a little longer, linear, rounded; terminal clasp segment somewhat enlarged, slightly arched; ovipositor not produced.  
*Stroblophila* Kieff.
- c*<sup>2</sup>. Terminal flagellate antennal segments cylindric.
- d*<sup>1</sup>. Circumfila with a length one-half the setæ, the stems shorter than the nodes, those of the two terminal segments wanting

\* Location provisional.

- or almost wanting, the terminal clasp segment large, greatly swollen; ventral plate entire..... Halodiplosis Kieff.
- d*<sup>2</sup>. Circumfila with short bows, the thirteenth and fourteenth segments with short stems; terminal clasp segment slender; ventral plate longer than the dorsal and deeply emarginate.  
Ametrodiplosis Rübs.
- d*<sup>3</sup>. Circumfila rudimentary.
- e*<sup>1</sup>. Costa with a fusiform swelling basad, the basal stem of the fifth antennal segment with a length equal to its diameter; ventral plate much longer than the dorsal, much constricted and with a deep, straight incision, the lobes pointed; terminal clasp segment arched and long..... Cyrtodiplosis Kieff.
- e*<sup>2</sup>. Costa not thickened basad, the basal stem of the fifth antennal segment with a length equal to the basal enlargement, the ventral plate sublinear, longer than the dorsal, narrowly incised and with two straight lobes; terminal clasp segment long, slender, curved..... Anthodiplosis Kieff.
- b*<sup>1</sup>. Palpi triarticulate.
- c*<sup>1</sup>. Basal clasp segment with a conspicuous triangular process apicad.
- d*<sup>1</sup>. Terminal clasp segment subapical, the claws as long as the pulvilli..... Dentifibula Felt.
- c*<sup>2</sup>. Basal clasp segment without a process apicad.
- d*<sup>1</sup>. Terminal clasp segment stout, with a length about three times its diameter; ventral plate almost truncate... Myricomyia Kieff.
- d*<sup>2</sup>. Terminal clasp segment ellipsoidal, pubescent.
- e*<sup>1</sup>. Ovipositor short, the length about equal to its diameter.  
Zeuxidiplosis Kieff.
- e*<sup>2</sup>. Ovipositor long, striate..... Stenodiplosis Reut.
- b*<sup>3</sup>. Palpi biarticulate.
- c*<sup>1</sup>. Third vein extending beyond the apex, the terminal clasp segment short, moderately stout, the dorsal plate short, deeply and triangularly emarginate..... Anadiplosis Tav.
- b*<sup>4</sup>. Palpi uniarticulate.
- c*<sup>1</sup>. Third vein uniting with the margin well beyond the apex, the dorsal and ventral plates both long and emarginate.  
Kronodiplosis g. nov.
- TRIFILI
- a*<sup>1</sup>. Claws toothed on all the legs.
- b*<sup>1</sup>. Palpi quadriarticulate.
- c*<sup>1</sup>. Circumfila with one or more greatly produced bows or loops having a length five to ten times that of the enlargement and extending at approximately right angles to it.
- d*<sup>1</sup>. Three well-developed circumfila on each flagellate antennal segment.
- e*<sup>1</sup>. The three circumfila irregular, the pulvilli rudimentary, the ventral plate spatulate..... Tribremia Kieff.
- e*<sup>2</sup>. Two circumfila irregular and one regular, the circumfilum on the basal enlargement with two greatly produced loops and the one on the distal enlargement with a shorter bow or loop,
- f*<sup>1</sup>. Pulvilli a little shorter than the claws..... Isobremia Kieff.
- f*<sup>2</sup>. Pulvilli rudimentary or wanting..... Cryptobremia Kieff.

- e*<sup>3</sup>. One circumfilum irregular and with a bow or loop greatly produced, the other two circumfila regular, the style simple.
- f*<sup>1</sup>. Ventral plate large, oval, as long as or a little longer than the dorsal; pulvilli equal to or longer than claws.
- Aphidoletes Kieff.
- d*<sup>2</sup>. Two well-developed, irregular circumfila; basal circumfilum on the distal enlargement forming a low band; pulvilli small.
- e*<sup>1</sup>. Legs clothed with hairs, the style not arched.
- f*<sup>1</sup>. Flagellate antennal segments with the distal enlargement produced, the basal subglobose, the ventral plate linear, not emarginate and as long as the simple style... *Bremia* Rond.
- f*<sup>2</sup>. Flagellate antennal segments with two subglobose enlargements, the ventral plate linear, emarginate and much shorter than the emarginate style..... *Homobremia* Kieff.
- e*<sup>2</sup>. Legs clothed with scales, the style strongly arched basally.
- f*<sup>1</sup>. Ventral plate shorter than the dorsal, linear and rounded distally..... *Lepidobremia* Kieff.
- c*<sup>2</sup>. Circumfila nearly regular and without one or more greatly produced bows or loops.
- d*<sup>1</sup>. Basal clasp segment with a basal lobe.
- e*<sup>1</sup>. Flagellate antennal segments trinodose; terminal clasp segment much produced, plainly longer than the basal clasp segment; ovipositor short and with large, orbicular lobes.
- Youngomyia Felt.
- e*<sup>2</sup>. Flagellate antennal segments binodose; terminal clasp segment not greatly produced, the ventral plate linear, a little longer than the dorsal plate; ovipositor moderately short and with long, densely haired lobes..... *Therodiplosis* Kieff.
- d*<sup>2</sup>. Basal clasp segment without a distinct basal lobe.
- e*<sup>1</sup>. Claws curved nearly at right angles.
- f*<sup>1</sup>. Palpi long or moderately long.
- g*<sup>1</sup>. Ventral plate linear, broadly emarginate; dorsal plate long, broad, triangularly emarginate, the circumfila slightly irregular, the style with filiform branches.
- Plesiobremia Kieff.
- g*<sup>2</sup>. Ventral plate long, narrowly rounded apically; dorsal plate broad, deeply and broadly emarginate, the lobes moderately narrow apically..... *Dichodiplosis* Rübs.
- g*<sup>3</sup>. Dorsal and ventral plates short, broad and deeply emarginate..... *Thomasia* Rübs.
- f*<sup>2</sup>. Palpi short, the second antennal segment with a length one-half greater than its diameter..... *Collinia* Kieff.
- e*<sup>2</sup>. Claws not strongly curved basad and therefore not forming almost a right angle.
- f*<sup>1</sup>. Circumfila with numerous loops, about twenty.
- g*<sup>1</sup>. Lobes of the ventral plate linear and parallel; ovipositor rather short..... *Geodiplosis* Kieff.
- f*<sup>2</sup>. Circumfilar loops short, the hairs two to three times longer.
- g*<sup>1</sup>. Lobes of the ventral plate short, broadly rounded; ovipositor short..... *Calodiplosis* Tav.
- f*<sup>3</sup>. Circumfilar loops normally long and not excessively numerous.

- g*<sup>1</sup>. Cross vein well developed and nearly parallel with costa as in the Porricondylariæ..... *Lopesia* Rübs.\*  
*g*<sup>2</sup>. Cross vein not well developed and nearly parallel with costa as in the Porricondylariæ.  
*h*<sup>1</sup>. Terminal clasp segment slender; lobes of the dorsal and ventral plates truncate; ovipositor short and with long, narrowly oval lobes..... *Resseliella* Seitn.  
*h*<sup>2</sup>. Terminal clasp segment stout; lobes of the dorsal and ventral plates narrowly rounded, the dorsal plate broadly, and the ventral plate deeply, emarginate; ovipositor long, with imperfectly divided lobes.  
*Harmandia* Kieff.  
*f*<sup>1</sup>. Genera known only as females and presumably belonging here in the key.  
*g*<sup>1</sup>. Ovipositor slightly protractile, the lobes long, curved, and with two or three longitudinal subventral rows of obtuse spines..... *Dicrodiplosis* Kieff.  
*g*<sup>2</sup>. Ovipositor about half the length of the abdomen, the lobes with a length about six times the width; mouth parts prolonged..... *Delphodiplosis* Felt.  
*g*<sup>3</sup>. Ovipositor moderately long, with a subcylindrical, dorsal part and a ventral oval plate with a narrowly triangular incision about one-fourth its length... *Schizodiplosis* Kieff.  
*g*<sup>4</sup>. Ovipositor short, with three subcircular lobes, the ventral a little smaller than the two dorsal..... *Cacopleus* Kieff.  
*b*<sup>3</sup>. Palpi triarticulate.  
*c*<sup>1</sup>. Flagellate antennal segments of female subcylindric.  
*d*<sup>1</sup>. Male with three well-developed circumfila, though without greatly produced bows or loops.  
*e*<sup>1</sup>. Circumfila with the loops short, thick and very numerous, each stem with a length less than its diameter; palpi moderately long; pulvilli rudimentary; dorsal and ventral plates long, the latter deeply emarginate and with relatively narrow lobes..... *Kalodiplosis* Felt.  
*e*<sup>2</sup>. Circumfila with the loops only moderately numerous, not unusually thick, each stem with a length about twice its diameter, the palpi greatly reduced; dorsal and ventral plates very short, both emarginate.  
*f*<sup>1</sup>. Ovipositor short, the terminal lobes narrowly oval, the dorsal and ventral plates short, emarginate.  
*Kamptodiplosis g. nov.*  
*f*<sup>2</sup>. Ovipositor about one-third the length of the abdomen, the basal portion long, stout, tapering, the lobes slender.  
Male unknown..... *Heliodiplosis g. nov.*  
*d*<sup>2</sup>. Male with two long circumfila, the second rudimentary, the loops not numerous, the pulvilli shorter than the claws, the dorsal and ventral plates deeply and roundly emarginate.  
*Roachadiplosis* Tav.

\* Included because of antennal structure although this insect belongs in the Porricondylariæ.

- c<sup>4</sup>. Flagellate antennal segments of female, at least some, binodose.
- d<sup>1</sup>. Female with two low circumfila on the cylindric distal enlargement of the flagellate antennal segments, none on the basal swelling; ovipositor about one-half the length of the body.  
Epihormomyia Felt.
- b<sup>3</sup>. Palpi uniarticulate.
- c<sup>1</sup>. Cross vein well developed and nearly parallel with costa; claws quadridentate..... Allodiplosis Kieff. and Jörg.
- c<sup>2</sup>. Cross vein not well developed and nearly parallel with costa; claws bidentate; circumfila very conspicuous and low as in *Asphondylia*..... Frauenfeldiella Rübs.\*
- a<sup>2</sup>. Claws on the anterior legs and sometimes those of the middle legs toothed, those of the posterior legs simple.
- b<sup>1</sup>. Palpi quadriarticulate.
- c<sup>1</sup>. Circumfila with one or more greatly produced bows or loops having a length five to ten times that of the enlargement and extending at approximately right angles to it.
- d<sup>1</sup>. Two irregular circumfila, one regular.
- e<sup>1</sup>. Pulvilli nearly equal to the claws, the ventral plate elongate distad, subcaudate..... Phænobremia Kieff.
- d<sup>2</sup>. One circumfilum irregular, two regular.
- e<sup>1</sup>. Pulvilli one-half the length of the claws; ventral plate straight, linear and much longer than dorsal plate... Monobremia Kieff.
- c<sup>2</sup>. Circumfila regular or nearly so and without greatly produced bows or loops.
- d<sup>1</sup>. Basal clasp segment lobed.
- e<sup>1</sup>. The lobe apical, setose or spinose; terminal clasp segment subapical..... Lobodiplosis Felt.
- e<sup>2</sup>. The lobe subbasal, glabrous; terminal clasp segment short and bidentate..... Antichiridium Rübs.
- e<sup>3</sup>. The lobe basal, setose or nearly glabrous.
- f<sup>1</sup>. Ventral plate or harpes strongly chitinized.  
Coquillettomomyia Felt.
- f<sup>2</sup>. Ventral plate and harpes as in *Lestodiplosis* and not chitinized..... Feltiella Rübs.
- d<sup>2</sup>. Basal clasp segment not distinctly lobed.
- e<sup>1</sup>. Terminal clasp segment subfusiform, distinctly dilated; harpes strongly chitinized and very complex..... Karschomyia Felt.
- e<sup>2</sup>. Terminal clasp segment not as above.
- f<sup>1</sup>. Claws curved nearly at right angles.
- g<sup>1</sup>. Ventral plate greatly elongate and emarginate apicad; dorsal plate deeply cleft and triangularly emarginate.  
Clinodiplosis Kieff.
- g<sup>2</sup>. Ventral plate rounded apicad; dorsal plate deeply and narrowly divided..... Oribremia Kieff.
- g<sup>3</sup>. Ventral plate broad, broadly and roundly emarginate, as long as the dorsal plate, the latter deeply and triangularly emarginate..... Profeltiella Kieff.

\* Possibly belongs in the Asphondyliariæ.

- f*<sup>2</sup>. Claws not strongly curved and therefore not forming almost a right angle.
- g*<sup>1</sup>. Ventral plate almost linear, straight and much longer than the dorsal plate..... *Acaroletes* Kieff.
- g*<sup>2</sup>. Ventral plate not greatly produced; lobes of the dorsal plate not divided, cleft or triangularly emarginate; female flagellate antennal segments with normal, low circumfila; ovipositor short..... *Mycodiplosis* Rüb.
- g*<sup>3</sup>. The female differs from *Mycodiplosis* in the two circumfila being produced as distinct and very short bows. Male unknown..... *Camptodiplosis* Kieff.\*
- b*<sup>2</sup>. Palpi triarticulate.†
- c*<sup>1</sup>. Claws not bent at nearly right angles; three well-developed circumfila.
- d*<sup>1</sup>. Terminal clasp segment not greatly produced; ventral plate short and broad..... *Diadiplosis* Felt.
- d*<sup>2</sup>. Terminal clasp segment greatly produced, with a length twice that of the basal clasp segment; ventral plate longer than the dorsal, moderately broad, rounded apically.... *Xiphodiplosis* Felt.
- c*<sup>2</sup>. Claws bent at nearly right angles; two well-developed and one rudimentary circumfilum; ventral plate linear, roundly emarginate apically..... *Chelobremia* Kieff.
- a*<sup>3</sup>. Claws simple or not toothed on any of the legs.
- b*<sup>1</sup>. Palpi quadriarticulate.
- c*<sup>1</sup>. The third vein uniting with the margin before the apex of the wing.
- d*<sup>1</sup>. Wings hyaline.
- e*<sup>1</sup>. Pulvilli as long or nearly as long as the claws.
- f*<sup>1</sup>. Stems of the flagellate antennal segments mostly with a length less than the diameter; circumfila rather short; ventral plate deeply bilobed, not greatly produced.  
*Arthrocnodax* Rüb. (*Feltodiplosis* Kieff.).
- f*<sup>2</sup>. Stems of the flagellate antennal segments probably rather long; circumfila moderately long; ventral plate much longer than dorsal plate, slender, greatly enlarged apicad, the distal portion with a width twice its breadth and slightly emarginate apicad..... *Microdiplosis* Tav.
- e*<sup>2</sup>. Pulvilli one-half the length of the claws or less.
- f*<sup>1</sup>. Terminal clasp segment swollen and long-haired basally, distally slender and smooth; ovipositor not produced.  
*Silvestrina* Kieff.
- f*<sup>2</sup>. Male unknown; female with the pulvilli hardly one-third the length of the sickle-shaped claws..... *Planodiplosis* Kieff.‡
- d*<sup>2</sup>. Wings densely brown-haired, with clearer spots; costa with black scales as in *Lasioptera*.
- e*<sup>1</sup>. Antennal hairs finely denticulate; thorax densely covered with yellow scales..... *Chrysodiplosis* Kieff.

\* This genus, *Baeodiplosis* Kieff., and *Alethediplosis* Tav. are known only in the female and presumably fall here in the tabulation.

† *Epihormomyia* Felt (see p. 315) may fall here in the key.

‡ Location provisional.

- c<sup>2</sup>. Third vein uniting with costa at the apex of the wing.
- d<sup>1</sup>. Claws as long as the pulvilli.
- e<sup>1</sup>. Wings hyaline.
- f<sup>1</sup>. Dorsal plate bilobed, the lobes rounded apically; ventral plate a little longer, straight, linear and slightly emarginate.  
Endopsylla Meij.
- e<sup>2</sup>. Wings bluish black, spotted with white.
- f<sup>1</sup>. Dorsal and ventral plates bilobed, the lobes large and rounded apically..... Doxodiplosis Kieff.
- d<sup>2</sup>. Claws plainly much longer than the pulvilli.
- e<sup>1</sup>. Metatarsus almost one-half the length of the second tarsal segment; dorsal plate bilobed; ventral plate linear and rounded apicad; ovipositor short..... Plagiodiplosis Kieff.
- e<sup>2</sup>. Metatarsus presumably less than one-half the length of the second tarsal segment; ovipositor as long as the body. Male unknown..... Orthodiplosis Kieff.
- c<sup>3</sup>. Third vein uniting with costa beyond the apex of the wing.
- d<sup>1</sup>. Circumfila irregular, one or more loops being greatly produced.
- e<sup>1</sup>. Wings hyaline.
- f<sup>1</sup>. Ventral plate much longer than the dorsal plate and rounded apically..... Hadrobremia Kieff.
- f<sup>2</sup>. Ventral plate longer than the dorsal, bilobed.  
Anabremia Kieff.
- e<sup>2</sup>. Wings yellow with black spots.
- f<sup>1</sup>. Legs spotted, thickly scaled; pulvilli nearly as long as the claws..... Plutodiplosis Kieff.
- d<sup>2</sup>. Circumfila with short bows or wanting.
- e<sup>1</sup>. Wings hyaline.
- f<sup>1</sup>. Some of the flagellate antennal segments cylindric.
- g<sup>1</sup>. Circumfila rudimentary or wanting; tenth to fourteenth segments cylindrical; harpes somewhat inflated.  
Prodiplosis Felt.
- g<sup>2</sup>. Circumfila distinct though low, all the flagellate or only the distal antennal segments cylindrical; male antennæ about as long as the body; ovipositor short.  
Caryomyia Felt.
- f<sup>2</sup>. Flagellate antennal segments binodose in the male.
- g<sup>1</sup>. Stems shorter than the enlargement, sometimes transverse.
- h<sup>1</sup>. Stems very short, transverse, antennæ about as long as the body; ovipositor short..... Caryomyia Felt.
- h<sup>2</sup>. Stems shorter than the enlargement; ovipositor long.  
Macrodiplosis Kieff.
- f<sup>3</sup>. Flagellate antennal segments probably binodose in the male, this sex being unknown.
- g<sup>1</sup>. Ovipositor short, the lobes bearing, laterad or ventrad, rows of heavy, truncate or club-shaped processes.  
Ctenodiplosis Kieff.
- g<sup>2</sup>. Ovipositor short, the lobes without conspicuous processes.
- h<sup>1</sup>. Pulvilli as long as the claws.
- i<sup>1</sup>. Basal flagellate antennal segments of female cylindrical..... Eohormomyia Felt.

- i. Basal flagellate antennal segments of female plainly binodose..... *Androdiplosis* Felt.
- h<sup>2</sup>. Pulvilli rudimentary..... *Diplecus* Kieff.
- e<sup>2</sup>. Wings spotted.
- f<sup>1</sup>. Terminal clasp segment very slender, subfiliform and smooth, the ovipositor short..... *Nanodiplosis* Kieff.
- d<sup>2</sup>. Circumfila well developed and not conspicuously irregular, the loops mostly as long as or longer than the diameter of the enlargement.
- e<sup>4</sup>. Claws bent at nearly right angles.
- f<sup>1</sup>. Basal clasp segment lobed.
- g<sup>1</sup>. Terminal clasp segment slender, curved, the ventral plate straight, pubescent..... *Octodiplosis* Giard.
- g<sup>2</sup>. Terminal clasp segment as long as the basal clasp segment, enlarged and bilobed apicad; ventral plate almost linear and rounded apically..... *Trichodiplosis* Kieff.
- f<sup>2</sup>. Basal clasp segment not lobed.
- g<sup>1</sup>. Ventral plate long, slender, slightly expanded and roundly emarginate apicad; dorsal plate short, triangularly emarginate..... *Giardomyia* Felt.
- g<sup>2</sup>. Ventral plate long, broad, very deeply and broadly emarginate; dorsal plate deeply and roundly emarginate.  
*Hyperdiplosis* Felt.
- g<sup>3</sup>. Ventral plate large, long and roundly excavated; dorsal plate bilobed, the lobes obliquely truncate.  
*Mycetodiplosis* Kieff.
- g<sup>4</sup>. Male unknown, female with the ovipositor short, the pulvilli rudimentary..... *Chætodiplosis* Kieff.\*
- e<sup>2</sup>. Claws not bent at right angles.
- f<sup>1</sup>. Basal clasp segment lobed.
- g<sup>1</sup>. The lobe apical.
- h<sup>1</sup>. The lobe very long, curved, setose; terminal clasp segment swollen basad..... *Epidiplosis* Felt.
- h<sup>2</sup>. The lobe triangular; terminal clasp segment short, greatly constricted near the middle and enormously swollen and recurved apicad..... *Metadiplosis* Felt.
- h<sup>3</sup>. The lobe small, densely haired; basal clasp segment with a length one-half that of the abdomen; circumfila each with twenty-six loops..... *Cælodiplosis* Kieff.
- h<sup>4</sup>. The lobe membranous and extending from the basal clasp segment to the dorsal plate; terminal clasp segment with a similar membranous expansion.  
*Tristephanus* Kieff.
- g<sup>2</sup>. The lobe basal.
- h<sup>1</sup>. The lobe obtuse.
- i<sup>1</sup>. Ventral plate long, broad, broadly rounded; claws a little longer than the pulvilli..... *Orseoliella* Kieff.
- i<sup>2</sup>. Ventral plate short, deeply bilobed; claws much longer than the pulvilli..... *Isodiplosis* Rübs.

\* See also under *g*<sup>3</sup> on page 320.

- h*<sup>2</sup>. The lobe triangular.
- i*<sup>1</sup>. Anterior legs with the underside of tibia and the first two tarsal segments with erect groups of hairs.  
Lamprodiplosis Kieff.
- i*<sup>2</sup>. Anterior legs without conspicuous groups of hairs.
- j*<sup>1</sup>. Wings spotted..... Lestodiplosis Kieff.
- j*<sup>2</sup>. Wings not spotted..... Coprodiplosis Kieff.
- f*<sup>2</sup>. Basal clasp segment not conspicuously lobed.
- g*<sup>1</sup>. Basal enlargement of the trinodose flagellate antennal segments with two circumfila, the distal with but one.
- h*<sup>1</sup>. Ventral plate sublinear, tapering, rounded apicad and much longer than the dorsal plate.... Xenodiplosis Felt.
- g*<sup>2</sup>. Anterior femur of the male plainly enlarged, it being three times the size of the tibia.
- h*<sup>1</sup>. Terminal clasp segment as long as the basal; ovipositor long, with a conical, fleshy apex..... Eumerosema Kieff.
- g*<sup>2</sup>. Antennal segments plainly trinodose.
- h*<sup>1</sup>. Dorsal plate divided, its lobes orbicular.  
Obolodiplosis Felt.
- g*<sup>4</sup>. Antennal segments short, thick, the stems transverse, the enlargements short, broad.
- h*<sup>1</sup>. Circumfila fine, rather short, each with numerous (about 20) loops; genitalia moderately stout, dorsal and ventral plates bilobed..... Retinodiplosis Kieff.
- g*<sup>5</sup>. Without the striking characters listed under *g*<sup>1</sup> to *g*<sup>4</sup>.
- h*<sup>1</sup>. Ventral plate linear, rounded apically.
- i*<sup>1</sup>. Dorsal plate much shorter than the ventral plate, the lobes truncate..... Paralelodiplosis Rübs.
- i*<sup>2</sup>. Dorsal plate longer than the ventral plate.  
Blastodiplosis Kieff.
- h*<sup>2</sup>. Ventral plate long, spatulate.
- i*<sup>1</sup>. Dorsal plate moderately long, broad, deeply and triangularly emarginate, the lobes broad, obliquely and roundly emarginate..... Hypodiplosis Kieff.
- h*<sup>2</sup>. Ventral plate greatly produced and lobed.
- i*<sup>1</sup>. Ventral plate broadly and roundly emarginate, the lobes diverging and broad..... Brachydiplosis Rübs.
- i*<sup>2</sup>. Ventral plate triangularly emarginate, the lobes triangular, the ovipositor short..... Eudiplosis Tav.
- i*<sup>2</sup>. Ventral plate divided, the lobes very long and spatulate.  
Styraxdiplosis Tav.
- h*<sup>4</sup>. Ventral plate broad and broadly or triangularly emarginate.
- i*<sup>1</sup>. Lobes of the ventral plate linear and parallel.
- j*<sup>1</sup>. The male with 14 and the female with 13 antennal segments; claws almost equal to the pulvilli; ovipositor long and filiform.  
Delodiplosis Tav.
- j*<sup>2</sup>. Male and female with 14 antennal segments; claws as long as the pulvilli; ovipositor stout and long.  
Phyllodiplosis Kieff.

- $\bar{v}^2$ . Lobes of the ventral plate not linear and parallel.  
 $j^3$ . Dorsal plate deeply incised, the lobes narrowly rounded, the terminal clasp segment with a broadly chitinized, serrate margin..... *Paradiplosis* Felt.  
 $j^2$ . Dorsal plate not incised or very narrowly emarginate.  
 $k^1$ . Genitalia large, with a length one-fourth that of the abdomen; ventral-plate lobes slender and diverging; ovipositor short and with subtriangular lobes..... *Plesiodiplosis* Kieff.  
 $k^2$ . Genitalia smaller, ovipositor not as described above.  
 $l^1$ . Terminal clasp segment large, swollen near the middle and hairy; ovipositor long, with short hairs and short-haired lobes.  
*Plemeliella* Seitz.  
 $l^2$ . Terminal clasp segment with a length one-half that of the basal clasp segment and slightly tapering; ovipositor conical and with a length twice its basal diameter.. *Pachydiplosis* Kieff.  
 $l^3$ . Terminal clasp segment as long or nearly as long as the basal clasp segment and smooth; ovipositor moderately long and with lobes.  
*Itonida* Meig.  
 $g^6$ . Genera known only as females.\*  
 $h^1$ . Cross vein present and well developed; pulvilli one-half as long as the claws; ovipositor small, produced.  
*Liebliola* Kieff. and Jörg.†  
 $h^2$ . Cross vein not well developed.  
 $i^1$ . Ovipositor several times the length of the body; pulvilli less than one-half the length of the claws.  
*Xylodiplosis* Kieff.  
 $i^2$ . Ovipositor as long as the body, the latter covered with scales; pulvilli rudimentary..... *Lepidodiplosis* Kieff.  
 $i^3$ . Ovipositor short; pulvilli rudimentary.  
*Chaetodiplosis* Kieff.  
 $i^4$ . Ovipositor short, the terminal lobes slender and with a length nearly equal to a body segment.  
*Ouradiplosis* Felt.  
 $b^2$ . Palpi triarticulate.  
 $c^1$ . Circumfila with short bows or loops, their length being one-half the diameter of the enlargement or less.  
 $d^2$ . Thorax plainly extending over and concealing the head, at least to a considerable extent.  
 $e^1$ . Male with 23 antennal segments, female with 14; the last or several of the distal segments in the male simple.  
*Hormomyia* H. Lw.  
 $e^2$ . Male with 36 antennal segments; flagellate segments all binodose and the stems short..... *Proshormomyia* Kieff.

\* Location provisional.

† Probably referable to the *Porricondylariæ*.

- e*<sup>3</sup>. Male and female with 14 antennal segments; flagellate segments of the female with 3 circumfila.... *Trishormomyia* Kieff.
- d*<sup>2</sup>. Thorax not produced over the head to a marked degree.
- e*<sup>1</sup>. Flagellate antennal segments of the male binodose.
- f*<sup>1</sup>. Basal clasp segment unarmed.
- g*<sup>1</sup>. Style not expanded apicad and with the sides not strongly chitinized.
- h*<sup>1</sup>. Third vein uniting with the margin well beyond the apex; wings long or rather long.
- i*<sup>1</sup>. Female with 3 circumfila on the flagellate antennal segments; ovipositor as long as the body.  
*Pseudhormomyia* Kieff.
- i*<sup>2</sup>. Female with 2 circumfila on the flagellate antennal segments; ovipositor not long..... *Dyodiplosis* Rübs.
- h*<sup>2</sup>. Third vein uniting with the margin before or near the apex, wings rather short, broad; flagellate antennal segments of the male binodose and with very short stems or cylindrical; male antennæ about as long as the body; ovipositor short..... *Caryomyia* Felt.
- g*<sup>2</sup>. Style expanded apicad and with the sides strongly chitinized.
- h*<sup>1</sup>. Dorsal plate triangularly emarginate; ventral plate long, broad, broadly and roundly emarginate.  
*Massalongia* Kieff.
- f*<sup>2</sup>. Basal clasp segment with a spine mesially.
- g*<sup>1</sup>. Pulvilli very small..... *Microplecus* Kieff.
- g*<sup>2</sup>. Pulvilli nearly as long as the claws..... *Holodiplosis* Kieff.
- e*<sup>2</sup>. Flagellate antennal segments of the male cylindrical, at least some.
- f*<sup>1</sup>. Third vein uniting with the margin near the apex; wings rather short, broad; male flagellate antennal segments binodose, with short stems or cylindrical; male antennæ about as long as the body; ovipositor short.  
*Caryomyia* Felt.
- c*<sup>2</sup>. Circumfilar loops with a length equal to the diameter of the enlargement or longer.
- d*<sup>1</sup>. Wings hyaline.
- e*<sup>1</sup>. Basal clasp segment lobed.
- f*<sup>1</sup>. Genitalia very long, slender, the length equal to two-thirds that of the abdomen..... *Ischnodiplosis* Kieff.
- f*<sup>2</sup>. Genitalia moderate in size; ventral plate chitinized and denticulate..... *Odontodiplosis* Felt.
- e*<sup>2</sup>. Basal clasp segment not distinctly lobed.
- f*<sup>1</sup>. The third vein uniting with the margin before or at the apex of the wing.
- g*<sup>1</sup>. Dorsal half of each eye segregated from ventral half and uniting on vertex to form a third eye group.  
*Trisopsis* Kieff.
- g*<sup>2</sup>. Eyes normal and not so widely separated.
- h*<sup>1</sup>. Claws a little longer than the pulvilli.
- i*<sup>1</sup>. Terminal clasp segment slender and smooth; dorsal

- and ventral plates bilobed; ovipositor short and with biarticulate lobes..... *Tricontarinia* Kieff.
- i*<sup>2</sup>. Ovipositor large, short and with obtuse lobes. *Atrichosema* Kieff.\*
- h*<sup>2</sup>. Claws small, much shorter than the pulvilli; ovipositor moderately long..... *Hydrodiplosis* Kieff.\*
- f*<sup>1</sup>. Third vein uniting with the margin beyond the apex of the wing.
- g*<sup>1</sup>. Fifth antennal segment of the female with a slight enlargement and a peculiar sensory organ near the middle. *Trissodiplosis* Kieff.
- g*<sup>2</sup>. Second antennal segment prolonged ventrally as an obtuse lobe; ovipositor short and with two long lobes. *Acodiplosis* Kieff.
- g*<sup>3</sup>. Antennal segments normal, without unusual processes or organs.
- h*<sup>1</sup>. Dorsal plate deeply and triangularly emarginate.
- i*<sup>1</sup>. Ventral plate triangular, broadly and roundly emarginate; ovipositor long and the lobes long. *Taphodiplosis* Kieff.
- i*<sup>2</sup>. Ventral plate linear, straight, not emarginate; ovipositor moderately long and the lobes long. *Haplodiplosis* Rübs.†
- i*<sup>3</sup>. Ventral plate linear, roundly emarginate; ovipositor acuminate and straight..... *Centrodiplosis* Kieff.
- h*<sup>2</sup>. Dorsal plate deeply and narrowly incised.
- i*<sup>1</sup>. Ventral plate broad and rounded; female unknown. *Adiplosis* Felt.
- i*<sup>2</sup>. Ventral plate narrowly emarginate; ovipositor moderately long, the lamellæ deeply bilobed. *Löwiola* Kieff.
- h*<sup>3</sup>. Genera provisionally placed here, the females only being known.
- i*<sup>1</sup>. Two circumfila, each with six to eight short bows; claws as long as the pulvilli..... *Plecophorus* Kieff.
- i*<sup>2</sup>. The two circumfila are flat or nearly so, otherwise as in *Plecophorus*..... *Aplecus* Kieff.
- d*<sup>2</sup>. Wings spotted.
- e*<sup>1</sup>. Third vein uniting with the margin beyond the apex of the wing; pulvilli nearly as long as the claws. *Stictobremia* Kieff.
- e*<sup>2</sup>. Third vein uniting with the margin at the apex of the wing; cross vein is present as in the *Porricondylariæ*. *Ampelosucta* De Stef.‡
- b*<sup>3</sup>. Palpi biarticulate.
- c*<sup>1</sup>. Wings hyaline.
- d*<sup>1</sup>. Circumfila short or only moderately long.
- e*<sup>1</sup>. Thorax not produced over the head.

\* Only the female is known; location provisional.

† *Putoniella* Kieff. will probably fall here in the table.

‡ This genus may belong in the *Heteropezinae*.

- f*<sup>1</sup>. Circumfila apparently doubled in both sexes; third vein uniting with the margin at the apex of the wing; pulvilli as long as the claws; ovipositor short, with three lobes.  
Dichrona Rübs.
- f*<sup>2</sup>. Circumfila not apparently doubled, low and with eight to ten small bows; third vein uniting with the margin beyond the apex of the wing; ovipositor large, conical and with two long lobes; male unknown..... Perodiplosis Kieff.
- e*<sup>2</sup>. Thorax produced over the head.
- f*<sup>1</sup>. Circumfila not apparently doubled in the female; third vein uniting with the margin beyond the apex of the wing; pulvilli about one-half the length of the claws.  
Dishormomyia Kieff.
- d*<sup>2</sup>. Circumfila long or at least moderately long.
- e*<sup>1</sup>. One or more basal antennal segments with an eccentric development or tooth.
- f*<sup>1</sup>. Second antennal segment with a large lateral and oblique conical process; thorax produced as a cone in front but not covering the head..... Conodiplosis Kieff. and Jörg.
- f*<sup>2</sup>. Second antennal segment prolonged ventrally as an obtuse lobe..... Neurodiplosis Kieff.
- f*<sup>3</sup>. The stem of the first flagellate antennal segment of the male with a lateral tooth near its middle; dorsal plate narrowly incised, ventral plate longer and rounded apicad.  
Orseolia Kieff. and Mass.
- e*<sup>2</sup>. Basal antennal segments without eccentric development or processes.
- f*<sup>1</sup>. Dorsal plate broad, broadly and roundly emarginate; ventral plate broad, triangular and slightly emarginate; ovipositor short, with two large, oval lobes bearing transverse rows of obtuse spines apicad..... Braueriella Kieff.
- f*<sup>2</sup>. Dorsal plate with the lobes obtusely truncate; ventral plate longer, linear, deeply and roundly emarginate; ovipositor short and with two lanceolate lobes..... Compsodiplosis Tav.
- f*<sup>3</sup>. Dorsal plate triangularly divided; ventral plate long, broad, roundly and slightly emarginate; style longer, rounded apically and the lateral margin strongly chitinized; ovipositor long, with two lanceolate lobes..... Massalongia Kieff.
- f*<sup>4</sup>. Male unknown.
- g*<sup>1</sup>. Ovipositor short, with a chitinized falciform blade.  
Jörgensenia Kieff.
- g*<sup>2</sup>. Ovipositor moderately short, the two lobes elongate.  
Courteia Kieff.
- c*<sup>2</sup>. Wings marked with yellow and fuscous.
- d*<sup>2</sup>. Fifth antennal segment with a stem one-half the length of the basal enlargement, which has a length four times its diameter; third and fourth segments free; third vein joins the margin beyond the apex of the wing; ovipositor short, the lobes angulate..... Scopodiplosis Felt.
- b*<sup>4</sup>. Palpi uniarticulate.
- c*<sup>1</sup>. Circumfila apparently doubled in the male and female.
- d*<sup>1</sup>. Pulvilli as long as the claws; ovipositor short and with three lobes..... Dichrona Rübs.

c<sup>3</sup>. Circumfila not apparently doubled in the male and female.

d<sup>1</sup>. Wings hyaline.

e<sup>1</sup>. Fourteen antennal segments in both sexes, the third and fourth not fused, the basal and distal enlargements globose and pyriform, respectively; dorsal and ventral plates deeply emarginate; ovipositor short, chitinous, falcate.

Monarthropalpus Rübs.

e<sup>2</sup>. Fourteen antennal segments, the fifth in the female with a stem one-third the length of the basal enlargement, which has a length two and one-half times its diameter; third and fourth antennal segments free; ovipositor stout, with a length one-half that of the abdomen, the distal part thickly clothed with long, silky hairs; male with moderately short circumfila, the fifth antennal segment having stems the length of which is twice the diameter; dorsal plate deeply, and ventral plate broadly, emarginate..... Onodiplosis Felt.

e<sup>3</sup>. Thirteen antennal segments in the female, the third and fourth fused, the basal and distal nodes globose and ovoid, respectively; dorsal and ventral plates bilobed; ovipositor short, chitinous, needlelike..... Cystodiplosis Kieff.

d<sup>2</sup>. Wings black and yellow marked.

e<sup>1</sup>. Basal and distal enlargement of the flagellate antennal segments globose and cylindrical, respectively; harpes forming a spinose, chitinous tube surrounding the style; ovipositor short, its lobes lanceolate..... Astrodiplosis Felt.

## ILLUSTRATION

### PLATE I

- FIG. 1. *Luzonomyia symphoremæ* Felt, g. et sp. nov.; male genitalia, diagrammatic, greatly enlarged. The shading indicates chitinization. (Original.)
2. *Luzonomyia symphoremæ* Felt, g. et sp. nov.; side view of ovipositor, diagrammatic. (Original.)
3. *Diceromyia vernoniæ* Felt, g. et sp. nov.; male genitalia, somewhat diagrammatic, greatly enlarged. Note in particular the greatly produced spines of the terminal clasp segment, dorsal and ventral plates not illustrated. The shading indicates chitinization. (Original.)
4. *Kronodiplosis uichancoi* Felt, g. et sp. nov.; third antennal segment of male, showing setæ and circumfila; diagrammatic, greatly enlarged. (Original.)
5. *Kamptodiplosis reducta* Felt, g. et sp. nov.; fifth antennal segment of male, showing general shape, setæ, and circumfila; diagrammatic, greatly enlarged. (Original.)
6. *Kamptodiplosis reducta* Felt, g. et sp. nov.; male genitalia, diagrammatic, greatly enlarged. (Original.)
7. *Heliodiplosis spatholobi* Felt, g. et sp. nov.; side view of ovipositor of female, diagrammatic, greatly enlarged. The shading indicates chitinization. (Original.)



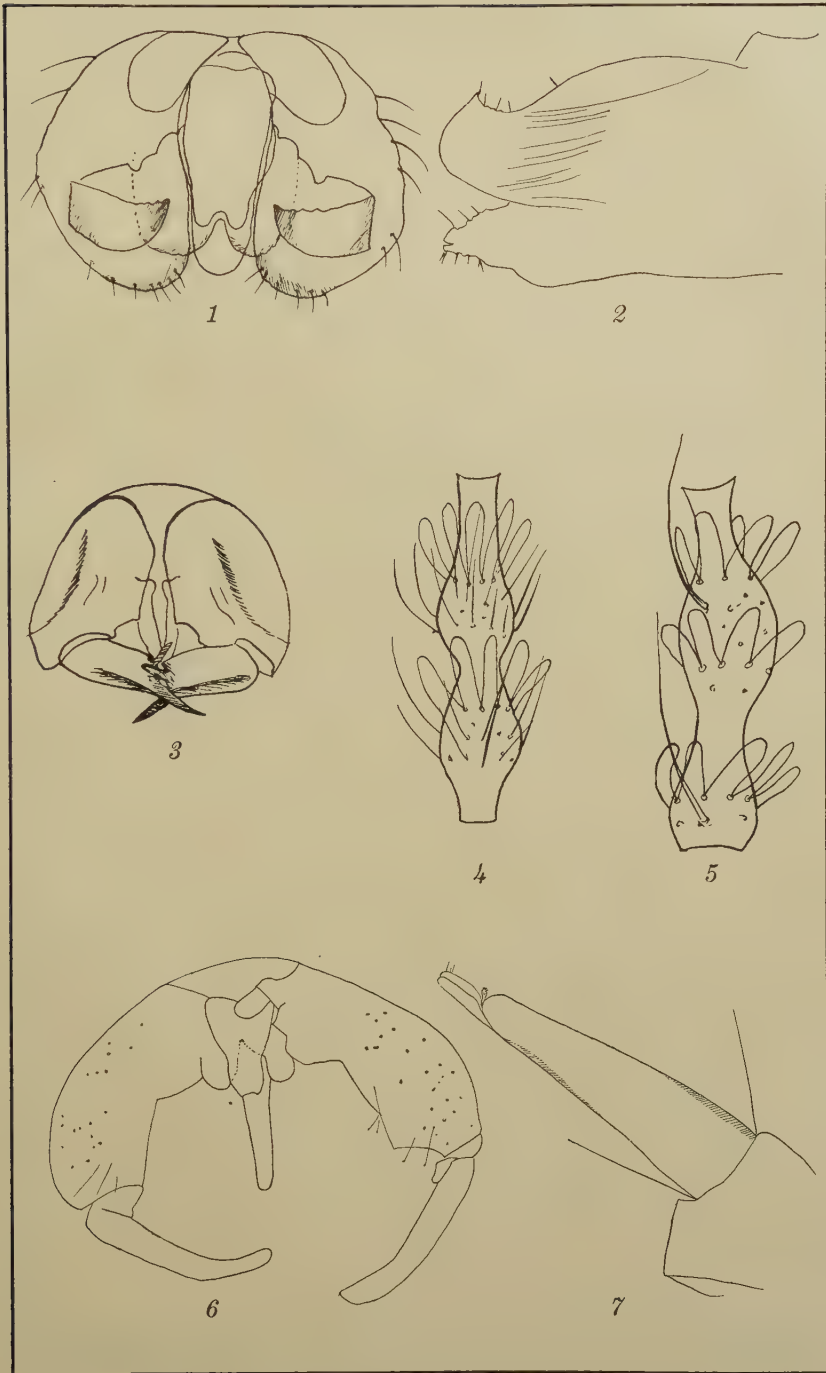


PLATE I. CHARACTERS OF NEW PHILIPPINE GALL MIDGES.



## SOME NOTES ON THE BIRDS OF SOUTHERN PALAWAN AND ADJACENT ISLANDS

By JOHN T. ZIMMER

(*Port Moresby, Papua*)

In 1916 it was my good fortune to spend most of March and the first few days of April on Palawan, perhaps the most interesting island of the Philippine Archipelago, taken from a natural-history standpoint. Geographically, Palawan is very close to Borneo, and this proximity is reflected to a marked degree in the fauna of the region.

During the visit in question particular attention was paid to the bird life of the area, and a number of very interesting avian species were collected. Some of these are of particular value in view of their rarity everywhere or because of their infrequency of occurrence in the Philippine Islands or in the local fauna of Palawan. Some are new to that island and one is sufficiently distinct from the typical form, as found in other parts of the Archipelago, to warrant its description as new.

The bulk of the collection is not of exceptional importance otherwise than as the record of the captures may be of value in considering the distribution or relative abundance of the species concerned. Certain birds were seen which were not collected for one reason or another, but as all of these have been taken on Palawan by previous workers and as most of them are well known to me through acquaintance in other parts of the Philippines, there are few of them whose identity is at all doubtful. To make the account complete, all forms that were seen are listed whether collected or not, and the specimens taken are catalogued. These specimens are in my private collection at Lincoln, Nebraska, U. S. A.

I am indebted to Mr. R. C. McGregor, of the Philippine Bureau of Science at Manila, for freedom of access to the collection of that institution and for his assistance in the comparison of certain specimens, and to Mr. Frank Reid, formerly lieutenant-governor of southern Palawan, and his assistant Mr. Tobin for many courtesies extended during the period of investigations.

### ITINERARY

Leaving Manila on the steamship *Panglima* I reached Puerto Princesa, the capital of Palawan, on March 4. That afternoon I

visited the forests back of the town and began the series of observations on which these notes are based. Leaving Puerto Princesa that night I arrived next morning at Brooke's Point which remained my headquarters for most of the remaining time.

Brooke's Point, or Point Sir James Brooke, is the name given to a sandy spit at the northern end of Ipolote Bay, a shallow harbor on the eastern coast of Palawan near its southern end. The adjoining region consists of a low sandy beach at the very edge of which begins a hardwood forest, overgrown with vines, creepers, and underbrush, extending inland for an average distance of a kilometer, there giving way to a grassy plain, marked with occasional thickets and scattered trees and bushes, which reaches to the mountains in the interior. Small streams and tidal swamps intersect the region with fringing vegetation of mangrove, nipa palms, or bamboo, the last occurring more commonly in the more open country. The whole area is nearly level until the mountains are reached. Outwardly the beach is fringed by coral reefs or sandbars or is open to the sea.

There is a small Moro settlement, Lara, at Brooke's Point and in the surrounding country may be found occasional huts of the Tagbanuas, sometimes with a greater or less amount of cultivated or cleared land nearby. These clearings and the native trails are the only open spaces of any great size in the forest, although certain parts of the latter are of a more open nature than others. It was along the trails that I did most of my collecting. Progress was difficult in the virgin jungle, and the birds there were not easy to approach. Moreover the species to be found there were usually near the trails in greater abundance. Consequently I found that the time spent in breaking a way through trackless areas could usually be more profitably spent in following a pathway that was already cleared.

I collected in the vicinity of Brooke's Point from March 5, the date of my arrival there, until the evening of March 17. On that date I embarked in a small launch with Governor Reid and Mr. Tobin, whose kindness made it possible for me to accompany them on an inspection trip around the southern end of the island and thus to visit a portion of the territory that otherwise I would not have seen.

March 18 we arrived at Sarong, a small village situated at the foot of a rocky bluff, which was overgrown with low jungle and extended along the shore. The principal feature of interest here was a broad coral reef, which was exposed at low tide and formed a feeding ground for numerous shore birds and

waders. We spent the day at this point and embarked again late the same evening.

March 19 we reached Dadagican at daylight and remained there until afternoon. This place consisted of a few houses grouped together on a small, low island, which was otherwise covered almost entirely by a coconut grove. Two species of herons, one species of kingfisher, a swallow, a swallow-shrike, a sunbird, a crow, and a lone sandpiper comprised the bird life of the island.

After leaving Dadagican we arrived at Bankalan at dusk, but as we departed again the same night I was unable to get any time in the forest at this place. The next morning, March 20, we reached Balabac Island. Our stay at Balabac was limited to one day. I found the country near the town of that name to consist mostly of forested hills of low elevation, without any level plains or open grassland.

March 21 we arrived at Dandelit where we spent the morning. This settlement is on the mainland of Palawan on the western coast and is situated in a small pocket at the foot of forested hills and cliffs which almost or quite meet the sea on either side. The jungle hereabouts is very dense, and as we put to sea again at noon, I was able, in the brief time available, to penetrate but a short distance into the tangle.

On the evening of March 21 we reached the settlement of Candauaga, which, also on the mainland, lies on a swampy plain at the mouth of a river, with a certain amount of good forest very near the shore and considerably more farther toward the mountains. This was my point farthest north along the western coast, as I made no effort to push on in that direction but remained at Candauaga for several days and explored the surrounding country.

The day after arrival I proceeded to the mouth of a second river a short distance to the south. At a small settlement nearby a boat and boatmen were secured, and I followed up the stream to the neighborhood of forests in the interior, returning that evening to Candauaga. Two days later I left most of my equipment in the launch, and accompanied by a Moro policeman from the Governor's party set out to cross the island to the eastern coast.

The first stage of the journey was made that night by boat, down the coast to the mouth of a broad river and up the current of the latter as far as our boat could go. There we embarked

in a little dugout and pushed on farther and when even this light craft grounded on the shallows we landed and made the rest of our way on foot. At a settlement not far from the landing guides were obtained for the mountain trails.

Leaving the settlement we took to the forest paths and crossed the mountain ridges until midafternoon, when we made camp by a little river high in the hills. The forest here was very dense, and birds apparently were scarce. Next day by an early start and by dint of strenuous hiking we managed to reach the settlement of Bonabona at dark. The way led first through mountain forests, then over grassy hillsides, and finally dropped to level, tree-dotted plains, alternating with swamps and marshland, until the sandy beach of the Sulu Sea was reached a short distance below our destination. From there we followed the beach to Bonabona.

I was unable to induce the natives of Bonabona to take me up the coast to Brooke's Point by boat, owing to heavy seas. Accordingly next morning, with fresh carriers, I took up the trail on foot and reached the desired locality by nightfall. The trail embraced seashore, grassed plains, open woods, mangrove swamps, broad river valleys, some of which were dry, and heavy forest, all practically at sea level.

On March 28, the day following arrival, I resumed operations at Brooke's Point and continued them until April 3, which was marked by the appearance of the steamer on which I planned to leave the locality. On the voyage up the coast between Brooke's Point and Puerto Princesa, the vessel stopped at Calatugas on April 4 and 5 and at Tagbariri on April 6 and 7. I went ashore at both places and found much the same type of country at both—a low sandy beach with forest in the rear. Beyond Tagbariri other matters occupied my attention and no further detailed notes were taken.

#### MEGAPODIIDÆ

##### *Megapodius cumingi* Dillwyn.

Occasionally I saw megapodes, usually in pairs, along the shore near Brooke's Point. The birds were very wary and when alarmed took a running flight into the nearby jungle, uttering a loud cackling note. I flushed one pair from the bottom of a burrow, which had been scratched for a depth of about one meter below the roots of an old stump. The bulky mounds constructed by the species were numerous in the woods bordering the beach.

## PHASIANIDÆ

*Gallus gallus* (Linnæus).

Jungle fowls were not rare in the forest but were more often heard than seen. One of the earliest sounds of the morning, before the rest of the forest seemed fully awake, was the crowing of the wild roosters back in the jungle. A flock of these birds, composed of a cock and six hens, remained in a certain part of the woods near the beach trail about two kilometers below Brooke's Point and was frequently encountered at that place. Other records are from Bonabona, Candauaga, Puerto Princesa, and Balabac.

## TURNICIDÆ

*Turnix fasciata* (Temminck).

This button quail was often flushed from the grass, rather abundantly on the open plains near Brooke's Point and Bonabona. It frequently lay close when discovered or skulked silently through the grass and was by no means easy to see unless it took wing. Localities for this species are Brooke's Point, Sarong, Candauaga, Tagbariri, Bonabona, and Balabac. One specimen was taken at Tagbariri.

## TRERONIDÆ

*Treron nipalensis* (Hodgson).

Thick-billed green pigeons were abundant in the neighborhood of the fruit trees in the forest. While moving about through the foliage they were easy to locate, but when alarmed they would stop and sit motionless, whereupon they seemingly melted into their leafy surroundings. I frequently collected other sorts of birds from various trees favored by the present species and often, at the report of the gun, saw the branches disgorge a score of these pigeons of whose presence I was entirely unaware until the sudden uproar and the charge of shot tearing through the foliage drove the hidden occupants from their retreat. Although most often assembling in flocks, these pigeons not infrequently went about in pairs, more rarely alone, and it is possible that the flocks at this time consisted of a number of pairs. My records are from Brooke's Point, Sarong, Dandelit, Candauaga, Bonabona, Calatugas, Tagbariri, and Balabac. Specimens were taken at Brooke's Point.

*Osmotreron vernans* (Linnæus).

Pink-necked green pigeons were abundant in the trees about the open and not uncommon at the edge of the forest. The

species was breeding at this time, and I often saw flocks of twenty or thirty males without one of the opposite sex. On March 17 I discovered a nest in one of the scattered trees on the grassland beyond the forest at Brooke's Point. The female was on the nest and remained there until I started to ascend the tree, when she left with a sudden rush and took a long round-about flight, which brought her up again to the top of a nearby tree within sight of her nest, where she remained until I left the neighborhood. The nest was a loosely constructed platform about 13 centimeters in diameter and was placed some 4 meters above ground. The eggs, which were distinctly visible from the ground through the bottom of the nest, were pure white, regularly elliptical, and measured 28 by 22 and 26 by 21 millimeters. Both were fresh. A second nest was discovered at Calatugas on April 5, similar to the first but only 1.2 meters from the ground. Unfortunately the eggs from the latter were broken before measurements could be taken. I found *O. vernans* at Brooke's Point, Candauaga, Bonabona, Calatugas, Tagbariri, and Puerto Princesa. The species is well distributed through the Philippines.

*Muscadivores palawanensis* (Blasius).

The Palawan imperial pigeons were common throughout the region wherever there was forest. Their deep "ah-hoo-oo" and guttural "kr'-r-r-r-r, kr'-r-r-r-r, kr'-r-r-r-r" were familiar sounds along the trails through the deep woods, although the birds became silent or took flight when aware of being approached. Since they usually chose the upper branches of the tall trees for their feeding grounds, it was not always easy to catch sight of them, even when they were noisy and moving about, nor was their collecting easy, for their perch was sometimes nearer rifle range than shotgun range. My records for this bird are from all points except Dadagican. Specimens are from Brooke's Point.

*Myristicivora bicolor* (Scopoli).

I saw a single nutmeg pigeon at Brooke's Point on March 12 but was unable to get within shotgun range of it owing to its wariness. This species was reported to me as being common on the west coast of Palawan near the settlement of Alfonso XIII, but I was unable to verify this for myself. Previous observers have recorded the species from other localities in Palawan.

## PERISTERIDÆ

*Spilopelia tigrina* (Temminck and Knip).

On several occasions in more or less open places along the trails I encountered the Malay spotted dove in pairs or in groups of four and five. It was not an abundant species. Usually the birds were on the ground; sometimes at low elevations in the scrub thicket. I have records from Brooke's Point, Bonabona, Candauaga, Tagbariri, and Calatugas. One specimen was taken at the first mentioned locality.

*Chalcophaps indica* (Linnæus).

I often saw the Indian bronze-winged dove in the forest, always singly as I have found it elsewhere. This species is always wary, is very swift on the wing, and darts through the woods at a rate of speed that would seem to threaten collision with tree trunks and other obstacles. In a dark forest it seems but a moving shadow. My notes record the species from Brooke's Point, Dandelit, Candauaga, Bonabona, Puerto Princesa, and Balabac.

*Calenas nicobarica* (Linnæus).

On March 15 I flushed two Nicobar pigeons in the deep forest at Brooke's Point but did not get the specimens, nor did I find the species at other times. They were reported to me as occurring commonly at Balabac and on the west coast of Palawan, but I did not see them at either place. Locally they were known as *siete colores*.

## CHARADRIIDÆ

*Arenaria interpres* (Linnæus).

A single turnstone was seen on the coral reef at Brooke's Point on April 1. I was unarmed at the time, and when I returned with a gun the bird had disappeared.

*Squatarola squatarola* (Linnæus).

On April 1 I found a flock of black-bellied plovers at Brooke's Point and secured one of the lot. This was the only occasion that I met with the species in Palawan.

*Ochthodromus geoffroyi* (Wagler).

Plovers of the genus *Ochthodromus* were occasionally seen along the beach at Brooke's Point and Sarong. The single specimen that I secured at Brooke's Point is *O. geoffroyi* to which species possibly all the individuals that I saw belong, although

both *O. mongolus* and *O. veredus* have been taken in Palawan by previous collectors.

*Numenius variegatus* (Scopoli).

At Sarong on March 18 I saw a number of curlews on the coral reef at low tide, but they were exceedingly wary, and I had difficulty in securing specimens. The reef was broad and the curlews kept to the seaward edge of it in company with numerous individuals of *Demigretta sacra* and *Bubulcus coromandus*, some of which always took alarm, if the curlews did not, and startled the whole flock into hasty flight, the result being that whenever I attempted to cross the intervening space of reef the entire company would be off and away long before I got within range. By taking a stand on the beach and waiting for fifteen or twenty minutes, however, I succeeded in so disarming the suspicion of the birds that they worked their way gradually into gunshot range and I was able to secure two of them before they got away again. Both individuals were females, and both were remarkable for their unusually long bills which measured 90 and 91.5 millimeters along the culmen, respectively, about the maximum for *N. variegatus*.

*Actitis hypoleucos* (Linnæus).

This common sandpiper, the only representative of its genus in the Islands, was frequently seen along the seashore or river banks or at the edges of forest pools. Although numerous it was very solitary in habits. I found it at all points visited.

[*Pisobia* sp?

There were one or two small sandpipers belonging to this group found occasionally along the reefs at low tide in the vicinity of Brooke's Point, while others were seen at Sarong although no specimens were taken. Most of them were probably *P. ruficollis* (Pallas), which is common and widely distributed in the Islands, but some of them may have belonged to the rarer *P. damacensis* Horsfield. Both forms have been recorded from Palawan.]

#### ÆDIDNEMIDÆ

*Orthorhamphus magnirostris* (Vieillot).

At Tagbariri on April 6 I saw an Australian stone plover alone on a reef which was cut off from the mainland by a channel of deep water. It was impossible to get within range and an experimental shot only had the effect of driving the bird to the far side of the reef, whence it shortly took flight seaward for a more distant islet.

## ARDEIDÆ

*Pyrtherodia manilensis* (Meyen).

On March 22 as I was floating down a river near Candauaga, a heron of the present species flapped lazily across the river in front of the canoe and disappeared in the mangroves that lined either bank of the stream. Another individual was seen on the reefs at Brooke's Point after I returned to that locality. These were the only instances of the occurrence of this species that came to my notice.

*Demigretta sacra* (Gmelin).

I saw the first blue reef heron at Brooke's Point on the afternoon of March 17. It had certainly not been in the neighborhood before that date. The following day at Sarong, farther south, the species was common and still later it was seen at Dadagican, Candauaga, and Bonabona. These are apparently the first records for Palawan, although *D. sacra* has been found on Cuyo and Balabac, and therefore its occurrence on the former island is not entirely unexpected. Specimens were taken at Brooke's Point and Sarong.

*Bubulcus coromandus* (Boddaert).

Indian cattle egrets were present at Brooke's Point, Sarong, Dadagican, Candauaga, Bonabona, and Tagbariri. They were not abundant at any of these places.

## FALCONIDÆ

*Accipiter virgatus* (Temminck).

At Calatugas on April 4 I saw a small hawk, which I am certain belonged to the present species, although unfortunately I was unable to secure the specimen. I refer it to *A. virgatus* because that species, but none of its congeners, has been recorded previously from Palawan.

*Spilornis bacha* (Daudin).

While crossing the mountains in the interior of Palawan on March 26 I saw a serpent eagle circling about, which came near enough to permit the recognition of its characteristic markings but not near enough for a shot. Palawan birds are referable to *S. bacha*.

*Butastur indicus* (Gmelin).

The tic-wee buzzard was not uncommon in the more open country back of Brooke's Point and was noted also at Calatugas, Bonabona, Puerto Princesa, and Candauaga. If not soaring

overhead it was perched on some exposed position where it kept close watch over the surrounding country.

#### CACATUIDÆ

*Cacatua hæmaturopygia* (P. L. S. Müller).

Cockatoos were abundant throughout the forest at all points visited except Dadagican. Owing to their active habits, their conspicuous plumage, and their noisy, screaming voices they were in evidence somehow most of the time. A certain dap-dap, or coral, tree (*Erythrina* sp.?) in the forest near the settlement at Brooke's Point was a favorite resort of these birds, and there they frequently congregated in some numbers. Most of the cockatoos had their ventral plumage stained brown with some gummy vegetable substance, giving them a very dirty appearance.

On May 4 at Calatugas I saw a pair of cockatoos at a hole near the top of a dead tree about 18 meters from the ground. It was the only suggestion of nesting conditions that I noticed.

#### PSITTACIDÆ

*Prioniturus cyaneiceps* Sharpe.

Blue racket-tailed parrakeets were probably not uncommon at Brooke's Point and elsewhere, but as they were neither very noisy nor very conspicuously garbed they were not often seen. Their note was a sort of harsh, grating squeak, which I heard a number of times before I succeeded in associating it with the parrakeets, but which after I had learned it often furnished me with the first intimation that these birds were in the vicinity. They easily concealed themselves in the foliage by the simple process of sitting motionless, though they might be in plain sight. Some of the individuals were in good plumage; others had the feathers badly abraded, especially the terminal rackets of the tail. Brooke's Point and Candauaga are the only localities where these birds were seen. Specimens were taken at Brooke's Point.

*Tanygnathus lucionensis* (Linnæus).

The Philippine green parrot was very abundant in the neighborhood of Brooke's Point. It congregated in flocks of greater or less size, which frequented the forest, often in company with the cockatoos whose noisiness was, if anything, excelled by the vociferation of the present species. Like the cockatoos these parrots were wary and alert, and although they might remain in apparent indifference to the approach of an observer they

were well aware of the narrowing distance and at the proper time departed with unceremonious speed. They often flew overhead clear above the forest, screaming loudly. My observations of *T. lucionensis* were confined to Brooke's Point, Candauaga, and Calatugas. Specimens were taken at Brooke's Point.

#### CORACIIDÆ

*Eurystomus orientalis* (Linnæus).

At Brooke's Point and Tagbariri where the edge of the forest adjoined the open country or in the neighborhood of the clearings, a few broad-billed rollers were observed. Even at these places they were not common.

#### ALCEDINIDÆ

*Alcedo bengalensis* Gmelin.

The usually common and widely distributed Asiatic kingfisher was not so common in southern Palawan as I have seen it elsewhere, but it was occasionally noted about the mangrove swamps and river banks. Records are from Brooke's Point, Sarong, Candauaga, Bonabona, Calatugas, Tagbariri, and Balabac.

*Alcedo meninting* Horsfield.

The Malayan kingfisher was much rarer in the region visited than its congener, the preceding species. I saw only two individuals, one at Brooke's Point on March 15 and another near Candauaga on March 22. Both were along the mangrove-bordered banks of rivers.

*Halcyon coromandus* (Latham).

Two ruddy kingfishers were noted on March 26 in the mountains behind Bonabona, but they escaped in the thick jungle. No others were seen.

Oberholser<sup>1</sup> has recently separated the Philippine form of this species under the subspecific name *ochrothorectis*. Since the Bornean *minor* has been taken in Tawitawi it seems probable that it would also occur in Palawan; therefore I will not attempt to place subspecifically the birds that I saw. In Oberholser's paper the generic name *Entomothera* is used for this species, not *Halcyon*. The characters on which the separation is based (conformation of bill, comparative length of primaries, and relative measurements of bill and wing) are such that most of the Philippine species of *Halcyon* could each be isolated there-

<sup>1</sup> *Proc. U. S. Nat. Mus.* (1915), 48, 652.

upon with equal facility. I have, moreover, specimens of the present species which do not agree well with the distinctive characters given for *ochrothorectis*. I have preferred, therefore, to follow the nomenclature used by Sharpe and followed by McGregor.

*Halcyon pileatus* (Boddaert).

On March 15 at Brooke's Point I saw a solitary black-capped kingfisher at the edge of a mangrove swamp into which the bird retreated at my approach. As progress in the swamp was infinitely more difficult for me than for the bird, it soon escaped entirely out of sight. At Balabac on March 20 I saw another of the species along a stream among the wooded hills, and on March 22 at Candauaga I saw a third at the edge of a nipa swamp bordering one of the rivers. I succeeded in getting none of them.

*Halcyon chloris* (Boddaert).

White-collared kingfishers were the commonest of all of their family in the region. More, perhaps, were noted in the neighborhood of human habitations than in the remote districts, possibly because the birds, like man, favored more or less cleared areas. A pair inhabited the tiny grove of coconuts behind the governor's house at Brooke's Point, where they were in evidence every day, for the most part fearless at my approach.

#### BUCEROTIDÆ

*Gymnolæmus lemprieri* (Sharpe).

The Palawan hornbill was a very interesting bird of which I saw rather less than I desired. It seemed to be a silent creature most of the time, not given much to vocal expression, but its voice when used was loud and raucous although less resonant and powerful than that of the larger *Hydrocorax* of other of the Philippine Islands. These hornbills were wary, though when startled they did not always seek distant forest depths but often settled again in trees hardly out of sight of the perches they had just abandoned. There, however, they remained alert and watchful, prepared to seek further safety in flight perhaps more readily than the first time they had been disturbed. They were fond of a certain large-seeded fruit, which was common in the forest, and upon which they were most often seen feeding in company with various of the pigeons. Occasionally solitary

individuals were seen, but flocks were much more common. I was able to get but a single specimen, a female, with bill much less prominently developed than that possessed by the males.

#### CAPRIMULGIDÆ

*Caprimulgus macrurus macrurus* Horsfield.

Nightjars were rather common at Brooke's Point where I often heard them in the evening along the beach or in the nearby clearings, uttering their weird "owk-owk," then after a little pause, "owk-owk" again, and so on monotonously well into the night, each call, perhaps, answered by other birds nearby. Occasionally I flushed them at the edge of the forest during the daytime and one specimen I took in a bamboo thicket along a stream in more or less open country. In daylight they were silent and stationary unless disturbed; only at night were they really active. Sometimes when I was not busy after dark, I would fasten a small acetylene searchlight to my hat and, armed with gun and bag, would go out jack-lighting for these birds and for other night wanderers of the forest. Guided by the sound of the monotonous note of the nightjars I could get within range of one of them before it took alarm, the light from the lamp producing an answering gleam from the bird's large eye, which would shine with a reddish glow in a single spot of fire that formed an excellent target. At times, before I could shoot, or if I continued to approach, the spot of flame would wink out and in a moment or two I would hear the interrupted monotone taken up at a different point and I would know that my bird had moved to a safer distance. If the night were brilliantly moonlit I might see the shadowy flutter of wings as the creature left its post or might even see it resting wherever it might be. Once or twice on such occasions I have thought, though I could never be certain of it, that the nightjars were then not the horizontal, crouching forms that they were in daytime, but that they sat more alert, more erect. I know that they often forsook terrestrial haunts, for I could see them perched on the tops of small bushes about a meter above ground.

I saw and collected birds only at Brooke's Point, but I heard others, some of which were undoubtedly the same form as the present one, at Candauaga and Tagbariri. *Caprimulgus manillensis* and *C. jotaka* have both been collected in Palawan, but all of my specimens are referable to *C. macrurus* and to the typical variety of that species.

## CUCULIDÆ

*Cacomantis merulinus* (Scopoli).

The rufous-bellied cuckoo was quite rare in the localities visited. A single female was seen and collected at Brooke's Point on March 14.

*Chalcococcyx xanthorhynchus* (Horsfield).

The beautiful little violet cuckoo was not common. I found it only thrice. All three birds were rather high up in tall trees in the forest at Brooke's Point, one at such a height that when I collected it I did not know what I had taken until it reached the ground. All three birds were males.

*Eudynamys mindanensis* (Linnæus).

Koels were heard not uncommonly in the forest, but owing to their secretive habits they were seldom seen, and then usually as they were slipping out of sight into some tangle of vines and creepers. Their song, if such it may be called, was a weird performance, especially if heard at the dead of night in the heart of the jungle. Beginning with a measured "ba-how', ba-how', ba-how'," the syllables would be repeated in a crescendo of rising pitch and acceleration until the last notes were given in a frantic "how-how-how-how" that was broken off abruptly, leaving a silence which seemed the more intense because of the preceding clamor.

Two species, *E. honorata* and the present form, have been recorded from Palawan but two specimens, male and female, which I secured at Brooke's Point are both referable to *E. mindanensis*. I noted koels, whichever form they may have been, at Brooke's Point, Tagbariri, Candauaga, Calatugas, and Puerto Princesa.

*Centropus javanicus* (Dumont).

Coucals were seen at Brooke's Point, Bonabona, and Candauaga in the areas of tall grass. They were not rare, but like the koels they were heard more often than they were seen. I saw only *C. javanicus*, although *C. sinensis* is recorded from the island.

*Dryococcyx harringtoni* Sharpe.

Harrington's cuckoo was found in the more jungly parts of the forest, usually skulking amongst the foliage of the lower growths and the vine-tangled thickets. In spite of its bright colors it is not a conspicuous bird. I found it in the lowland forest as well as on the wooded mountain ridges. Records and

specimens are from Brooke's Point, Candauaga, Bonabona, and Balabac, and records only from Sarong and Tagbariri.

#### PICIDÆ

*Tiga everetti* Tweeddale.

Everett's three-toed woodpecker was moderately common and well distributed over the region. I found it in the deeper parts of the forest and sometimes in the thicker bits of scattered woodland on the plains. My records are from all points visited except Dadagican. Specimens are from Brooke's Point.

*Thriponax hargitti* Sharpe.

I found Hargitt's black woodpecker to be rare and shy in the vicinity of Brooke's Point; at the other localities I did not find it at all. It is possible that there was only a single pair near Brooke's Point. I rarely saw more than one bird, which was very restless and shy, continually moving from place to place in the forest. I never got within range of it until March 17. On that day, while crossing a swampy section of woods, I happened to take shelter from a sudden downpour of rain on the leeward side of a large tree whose buttressed roots furnished ample protection from the shower. While there I heard the call note of the species with which I had become familiar, and on looking out from my retreat I saw one of the woodpeckers on a tall, dead tree nearby, just within range. I dropped it from where I stood, retrieved it, and returned to my shelter. Again I heard the unmistakable note and looked out just in time to see a second bird edging out of sight around the dead tree trunk. I circled the bole in the opposite direction, but the woodpecker had evidently taken flight when out of my sight around the trunk, and I did not get it. It was the last time I saw the species in Palawan. My specimen was a male. I have carefully compared this specimen with the series from Masbate in the collection of the Bureau of Science with which it seems to agree perfectly. Palawan is the type locality of this species but as has been pointed out by other workers it is strange that the Masbate bird is conspecific, in the case of the present genus.

#### PITTIDÆ

*Pitta propinqua* (Sharpe).

I searched for the Palawan pitta the whole time that I remained in the region, but it was near the end of my investigations before I found it. On March 31 I found a lone individual in the heart of a bit of jungle, quite close to the settlement at

Brooke's Point. It would have been overlooked entirely had it not taken flight, for it was silent and well hidden in a particularly dense thicket not in my line of travel. The specimen was collected and proved to be a male.

*Pitta atricapilla* Lesson.

The black-headed pitta was occasionally seen and frequently heard in the forest, especially in those parts overgrown with underbrush. I found it at Brooke's Point, Sarong, Candauaga, Balabac, and along the trail across the mountains between the east and west coasts. Specimens were taken at Brooke's Point and Balabac.

Most of the pittas, of this and related species, which I have found have been on the ground or at most a few feet above it, on fallen tree trunks and the like. One of the present species that I saw at Brooke's Point, however, proved an exception to the general rule. I heard this bird distinctly and had no difficulty in reaching its approximate neighborhood. Once there, however, I was puzzled to get the bird in sight, although it continued its explosive "wow ha" apparently only a few yards away. Since the ground was more or less open thereabouts I was able to scan carefully every bit of it, but without result until I happened to glance upwards when, to my surprise, I saw the pitta on a projecting limb of a tree twenty feet above ground.

#### HIRUNDINIDÆ

*Hirundo javanica* Sparrman.

The Asiatic swallow was the only member of its family that I noted in Palawan. I saw it at all points visited, where it was present in small numbers, usually near the settlements.

#### MUSCICAPIDÆ

*Hemichelidon griseosticta* Swinhoe.

Two gray-spotted flycatchers were seen in Palawan, one at Candauaga and the other at Brooke's Point, and both were secured. The Candauaga specimen differs somewhat from the other and from all other specimens of the species that I possess. The brown streaks on the breast and sides occupy the major portions of their respective feathers, the white of the underparts is tinged with buff, the edging of the tertials and greater wing coverts is deep buff, while the under wing coverts are more tawny than is usual. The base of the bill is yellowish, and the entire appearance suggests the description of *H. sibirica*,

but the bird shows signs of immaturity and is in rather poor plumage, so that I would hesitate, without a series of *sibirica* at hand, to place my specimen in that species. There is a single record of *sibirica* from Palawan.

*Cyornis lemprieri* Sharpe.

Lempriere's cyornis was not abundant but was rather well distributed and of sylvan habits. My records are from Brooke's Point, Dandelit, Candauaga, and Balabac. Specimens were taken at the first three localities.

Two of my males are typical *Cyornis lemprieri*, but a third, No. 1445, is indistinguishable from *C. philippinensis* by the characters usually given for the separation of the two species. The orange hue of the under surface of the body is no paler than in my Luzon birds, and while the throat is paler, inclining to whitish, the same character is exhibited in some specimens of *C. philippinensis*. With this fact in mind I made a comparison of my specimens with the series in the Bureau of Science collection and found the existence of other characters which serve very well to separate the two forms, as represented in the two collections. In all of the males of *C. philippinensis* the black chin spot is present and well marked. In some of the males of *C. lemprieri* this spot is also present but never to the extent exhibited by the maximum of *philippinensis*, while it is sometimes entirely lacking. Where it is present, the specimens all possess the lighter tints on breast and throat, as indeed they do in some cases where the chin is not black, but in all cases where the ventral coloration approaches that of *C. philippinensis* the black chin spot is lacking. In *C. lemprieri*, also, the sides of the breast average more broadly blue, and in one of my specimens the feathers across the breast are narrowly edged with blue. The females are, of course, unmistakable.

*Cyanoptila bella* (Hay).

On March 28 at Brooke's Point I collected a female of this interesting species at the edge of the forest, where it was conducting forays from a perch on a vine-covered stump, darting out after insects and returning to its post in true flycatcher fashion. It was the only one of its species that I saw.

Collected by Everett in Balabac, and recorded by him in 1895, the Japanese blue flycatcher has not been found since in the Philippines; nor is there any other evidence of its occurrence there except the notation by Sharpe in his Hand-list, in which Palawan Island is given as a habitat of the species as well as Balabac

—Balabac evidently on Everett's record, Palawan on evidence which I do not know.

*Hypothymis occipitalis* (Vigors).

The black-naped flycatcher was quite common and widely distributed. Records are from all points except Dadagican. Specimens were secured at Brooke's Point.

*Rhipidura nigritorquis* Vigors.

The only black-and-white fantails that I saw were at Bonabona on March 25 and 26. In both cases they were in the neighborhood of mangrove swamps.

*Xeocephus cyanescens* Sharpe.

I saw the large blue flycatcher at Brooke's Point and Candauga and in the mountains of the interior, but it was not very abundant at any of these places. Its habitat seemed to be the thickets and second growth of the forest. Specimens were taken at Brooke's Point.

#### CAMPOPHAGIDÆ

*Artamides difficilis* (Hartert).

The Palawan artamides was common throughout the forest, where it remained in the higher branches. I usually saw the species in pairs, though sometimes singly. It was rather impassive, neither obtrusive nor retiring. Records are from all points but Dadagican. Specimens are from Brooke's Point.

*Pericrocotus igneus* Blyth.

The brilliant little fiery minivet was observed only at Brooke's Point and Puerto Princesa, at both of which places specimens were taken. Not many individuals were seen. It was always in the deep forest, very active and constantly moving about from place to place. Its note was a rapid twitter much like that of *P. cinereus*. This latter species I did not see, but since it has been found in Palawan by other workers, it may have been the author of the song on some of the occasions when I heard but could not see the minivets.

*Lalage niger* (Forster).

I saw a few examples of the pied lalage in the forest at Brooke's Point and Candauga. Although common enough in certain other parts of the Archipelago, this species does not seem to have been recorded from Palawan by many observers.

*Ægithina viridis* (Bonaparte).

This pretty little species was found rather commonly at Brooke's Point, but at none of the other localities except Bonabona. Its favorite haunts were in the thickets of the more open country, though it occasionally visited the deep forest. For some time I heard the distinctive note of some bird I did not know, given from the upper foliage of the forest trees, but all my efforts to locate and identify the singers were unavailing. Even when I collected *A. viridis* in the forest, I did not associate it with the mysterious songsters, for the birds had been silent when I saw them. Later I found the more-favored resort of the species in the grassland thickets among the lower trees and less dense foliage, and there I was able to solve the puzzle, for the birds were singing plentifully and in full view.

## PYCNONOTIDÆ

*Chloropsis palawanensis* (Sharpe).

Leafbirds were noted in the forest at several localities, but owing to their leaf-colored plumage they were most difficult to see when in moderately dense foliage. I found them hard to kill outright with fine shot, a circumstance for which I could only account by the cottony texture of the plumage, which undoubtedly offered more or less resistance to the penetration of the pellets. I found the species present at Brooke's Point, Candauaga, and Puerto Princesa. Specimens are all from the neighborhood of Brooke's Point.

*Irena tweeddalei* Sharpe.

Tweeddale's fairy bluebird was not uncommon in the deeper parts of the forest where I noted it most often in the vicinity of various fruit trees. It was inclined to be somewhat wary but was also inquisitive so that when I remained quiet enough it would often come quite close, although a sudden motion on my part would send it off again. The males, truly magnificent birds, were much more in evidence than the plainer females, which latter seemed to be of a more retiring disposition. My records are from Brooke's Point, Candauaga, and Puerto Princesa, at all of which places specimens were secured.

*Microtarsus atriceps* (Temminck).

The black-headed bulbul was commonly noted at several places. Usually it was at the edge of the forest or in thickets on the plains. Sometimes it was found singly, at other times in flocks

of a dozen or more. However, it was rather shy and hard to approach. My notes were made at Brooke's Point, Candauaga, Bonabona, and Puerto Princesa. Specimens were taken at Brooke's Point and Puerto Princesa.

*Trichophorus frater* (Sharpe).

The gray-throated hairy bulbul was quite common in the lower growths of the forest and about the fruit trees. It was given to a desultory sort of song of a somewhat conversational nature though hardly musical. Specimens were taken at Brooke's Point and Candauaga and the species was seen at all points visited except Dadagican.

*Pycnonotus cinereifrons* (Tweeddale).

The ashy-fronted bulbul was apparently less common than the preceding species, yet the lack of more records may have been on account of the birds' secretiveness, which sent them into the depths of the thickets at the slightest alarm and probably put them in hiding many times before I caught sight of them. Records and specimens are from Brooke's Point, Candauaga, and Bonabona.

TIMALIIDÆ

*Turdinus rufifrons* (Tweeddale).

I took two rufous-headed babblers at Brooke's Point and in the mountains shot one other, which was unfit to preserve. The species is reported to be a good whistler, but the individuals that I saw were silent.

*Mixornis woodi* Sharpe.

The Palawan tit babbler was very common over most of the region and was found about brush piles and in the thickets and undergrowths of both the deep forest and the more open country. It was quite fearless and could be approached rather closely. It was a very active little bird, almost constantly poking about its favorite haunts, usually close to the ground. My records are from all localities except Sarong and Dadagican. Specimens were taken at Brooke's Point only.

TURDIDÆ

*Petrophila manillensis* (J. R. Forster).

Eastern rock thrushes were fairly common in Palawan, about as numerous as in the rest of the Archipelago. I saw individuals at all localities except Sarong and Dadagican.

*Kittacincla nigra* Sharpe.

The Palawan black shama was the chief musician of the forests where I found it. Its sweet song had a wide range of tone and a number of variations, which the bird was not at all chary of demonstrating, although while performing it liked to keep hidden in the shelter of the fern thickets and other undergrowth. When startled, it did not fly far but took refuge quite near at hand behind the first convenient screen or at a little greater distance in the open. Except at Sarong and Dadagican it was noted regularly. Specimens were taken at Brooke's Point.

## SYLVIIDÆ

*Locustella ochotensis* (Middendorf).

I found the yellow grasshopper warbler by sheer luck, on March 17. I had just shot an *Ægithina viridis* from a low tree on the cogon plain, behind the forest at Brooke's Point, and had stooped to pick the specimen from the ground, when I saw a small brown bird disappearing into a patch of tall *talahib* grass. With my specimen in one hand, I steadied the gun and fired at the disappearing bird, which must have been out of sight before the charge of shot reached the place. I went forward, hardly hoping for success, but on parting the grass stems I found the warbler where it had fallen. This is the first record of *L. ochotensis* from the Palawan group of islands. It is not a common bird anywhere in the Philippines.

*Orthotomus ruficeps* (Lesson).

Rufous-headed tailorbirds were not common. I usually found them in the thickets and brush piles, where they skulked wren-like, and for the most part silent. Individuals were seen at Brooke's Point, Sarong, Candauaga, and Bonabona. Specimens were taken at Brooke's Point.

## ARTAMIDÆ

*Artamus leucorhynchus* (Linnæus).

The white-bellied swallow shrike was common about dead trees in the clearings and at the edge of the forest. It was noted at Brooke's Point, Dadagican, Candauaga, Bonabona, Tagbariri, Calatugas, and Puerto Princesa.

## LANIIDÆ

*Otomela lucionensis* (Linnæus).

A single shrike of the genus *Otomela* was noted at Brooke's Point on March 8 but was not taken. As there is a possible

doubt as to the exact species which this bird may have been, I have bracketed the record, but I have little hesitation in referring it to the present form.]

*Hyloterpe whiteheadi* Sharpe.

The Palawan thickhead was rare. Three specimens only were secured, and these were all that I saw. All three birds were in the deep forest at Brooke's Point, shy and elusive.

#### PARIDÆ

*Pardaliparus amabilis* (Sharpe).

The Palawan titmouse was rather common in the forest, although not abundant. When seen it was sometimes associated with other species of birds, sometimes alone, but usually in small flocks of four or five individuals of its own kind. Records are from Brooke's Point, Sarong, Dandelit, Candauaga, Bonabona, and Balabac. Specimens are from Brooke's Point.

#### SITTIDÆ

*Callisitta palawana* (Hartert).

It was only at Brooke's Point that I saw the Palawan nuthatch, but it seemed to be moderately common at that locality. It was a strictly forest form, very active and energetic, with the characteristic nuthatch habits of travelling upward, downward, or sideways, right side up or the reverse with equal facility, while exploring the cracks and crannies of the bark in search of food. Specimens were taken.

#### DICÆIDÆ

*Dicæum pygmæum* (Kittlitz).

Pygmy flowerpeckers were common in the forests at Brooke's Point, Sarong, Candauaga, and Bonabona. They often came to within a few feet of me, apparently impelled by curiosity and not at all governed by fear of the intruder.

*Prionochilus johannæ* Sharpe.

The Palawan flowerpecker was found commonly in the forest at Brooke's Point, Sarong, Dandelit, Candauaga, Bonabona, Tagbariri, Calatugas, Puerto Princesa, and Balabac. It was a quite fearless and very active little bird. Specimens were secured at Brooke's Point.

*Acmonorhynchus affinis* sp. nov.

*Characters of the species.*—Very similar to *Acmonorhynchus æruginosus* (Bourns and Worcester) but upper parts decidedly

more greenish; remiges and rectrices with broader, brighter olivaceous edging; terminal white spots on outer rectrices smaller, more sharply defined; under parts paler generally but with the pale areas, though more extensive, less pure white; ventral streaks indistinct or obscured by pale margins to feathers; size smaller; bill shorter and broader in proportion, more obtuse. Sexes similar.

*Type*.—No. 1446, male, adult, collection of J. T. Zimmer; Brooke's Point, Palawan, P. I., March 14, 1916, collected by J. T. Zimmer.

*Description*.—Above olivaceous, back and interscapulars between dark citrine and warbler green, becoming browner on the head, brighter and more yellowish on rump and upper tail coverts, which are nearly pyrite yellow; wing coverts, remiges, and rectrices chætura black broadly edged with olive yellow, becoming strontian yellow on outer primaries, tertials tipped with olive yellow; two outer pairs of rectrices with sharply defined, narrow terminal spot of white on inner web; feathers of whole top of head with darker brown centers; forehead inclining to ashy; lores whitish; a narrow eye ring pale yellow; a white malar line separated from the throat by an indistinct brown line; throat white; rest of under parts white with a buffy tinge, almost marguerite yellow; breast, flanks, and sides of abdomen indistinctly streaked with dark hair brown, more or less obscured by pale margins to the feathers; under tail coverts with median, basal brown markings. Length, 111 millimeters; wing, 63; tail, 35; tarsus, 14; culmen from base, 7; bill from nostril, 5; greatest width of bill, 7.<sup>2</sup>

*Type*.—No. 1499, female, adult, collection of J. T. Zimmer; Brooke's Point, Palawan, P. I., March 31, 1916, collected by J. T. Zimmer.

*Description*.—Indistinguishable from the male in general appearance. Length, 112 millimeters; wing, 60; tail, 32; tarsus, 14; culmen from base, 8; bill from nostril, 6; greatest width of bill, 7.

Only two individuals of this species were seen, the two which constitute the types. They were found in the deep forest asso-

<sup>2</sup> A series of four adult males of *A. æruginosus* in my collection from Luzon have the following respective measurements (in millimeters): Length, 116, 117, 113, 118; wing, 66, 66.5, 66, 67; tail, 35, 37, 38, 38; tarsus, 14, 14, 14, 14; culmen from base, 9, 9, ?, 9; bill from nostril, 6.5, 6.5, ?, 7; greatest width of bill, 7, 7, 6.5, 6.5. One specimen has the tip of its bill damaged; hence the interrogations.

ciated with *Prionochilus johannæ* in both cases. So far as I know there are no other records of any birds of this genus having been found on Palawan.

#### NECTARINIIDÆ

##### *Æthopyga shelleyi* Sharpe.

Shelley's sunbird was quite rare, but it was occasionally found in the forest in company with other species of sunbirds. Its song was a peculiar, thin pipe, very high in tone, difficult to describe, but quite distinctive and unmistakable when once heard. Records and specimens are from Brooke's Point and Balabac.

##### *Cinnyris sperata* (Linnæus).

The red-breasted sunbird was seen occasionally in company with other species of the family, but it was rather uncommon and more wary than the others, and was usually the first to take alarm. The brilliant plumage of the males made them conspicuous even at a distance, while if they were in the bright sunlight they were dazzling. I noted the species only at Brooke's Point, where I secured four males.

##### *Cinnyris aurora* (Tweeddale).

The dap-dap, or coral, trees (*Erythrina indica?*) were in full bloom at Brooke's Point, and about their flaming blossoms were scores of bright-hued sunbirds of several species among which the present one was most in evidence. One of these trees, not a great distance from the house, was one of the liveliest spots in the forest. At times I have seen parrots, cockatoos, leaf-birds, nuthatches, chickadees, woodpeckers, orioles, flowerpeckers, sunbirds of various kinds, spider-hunters, pigeons, and starlings, all in this tree at once, while in nearby foliage were cuckoos, fairy bluebirds, flycatchers, minivets, thrushes, tailor-birds, bulbuls, and the like. The clamor was indescribable, and the conglomeration of assorted colors exhibited by the assemblage and set off by the brilliant blossoms of the tree was most striking and yet harmonious. Toward the latter part of my stay in the region the dap-daps began to drop their flowers and put out leaves and the host of visitors once accustomed to assemble and feast on these hospitable branches now sought other places of entertainment. Then these spots where I had previously found the bird life most abundant became by comparison quite deserted.

*Cinnyris aurora* was noted at every locality visited. Specimens were secured at Brooke's Point.

*Anthreptes malaccensis* (Scopoli).

The brown-throated sunbird was common, particularly about the dap-dap trees. The localities of observation were Brooke's Point, Sarong, Candauaga, Bonabona, and Balabac. Specimens were taken at Brooke's Point.

*Arachnothera dilutior* Sharpe.

Pale spider-hunters were not common, but I saw them occasionally at Brooke's Point, sometimes in company with other birds about the fiery dap-daps, sometimes alone in the deeper forest. To me they always appeared grave and solemn, with owlsh demeanor, this aspect being due, no doubt, partly to their quiet habits and partly to their long bills and "spectacled" eyes. Most of my records are from Brooke's Point as are all of my specimens. One bird was seen at Bonabona.

## MOTACILLIDÆ

*Motacilla ocularis* Swinhoe.

I noted the streak-eyed wagtail only at Brooke's Point. On March 11 I saw two of these wagtails on the beach; they were very wild and would not permit me to approach, but flew off around a point where I could not follow them. The following day I revisited the sandspit where I had seen the wagtails in the hope of seeing them again and possibly of securing specimens. I was partially successful. One bird was present. As before, it flew immediately upon sighting me, but it alighted on the beach nearby, and by keeping some shrubbery between myself and the bird I managed to get close enough for a long shot. The specimen I thus obtained was a female in molt with the chin and throat black centrally and white laterally. Otherwise the plumage is the full summer one.

*Motacilla melanope* Pallas.

The gray wagtail was rather common about the cleared ground near the settlement at Brooke's Point, but it was not seen elsewhere.

*Budytes leucostriatus* Homeyer.

The Siberian yellow wagtail was noted at Brooke's Point and Bonabona usually, except at the last named locality, in company with the preceding species. One specimen was taken.

*Anthus gustavi* Swinhoe.

The Petchora pipit was frequently flushed from the ground in the deep forest at Brooke's Point. Usually when flushed it flew for only a short distance before alighting on the ground

again. Sometimes it did not fly at all, but ran or walked rapidly away not in a straight line but by a tortuous course behind plants, bits of rubbish and the like, which concealed its movements and helped it to escape. On a few occasions it ascended to the branches of nearby trees, sometimes to a considerable height. Although not rare at Brooke's Point the species was not found at any other locality. Several specimens were taken.

*Anthus cervinus* (Pallas).

At Brooke's Point there were one or two flocks of red-throated pipits, which could usually be found in a clearing at the edge of the forest near the settlement. There I took six specimens, which exhibit a wide gradation of plumage, ranging from the garb of the young bird to full adult livery. Birds with the streaked, young plumage were most in evidence.

#### PLOCEIDÆ

*Munia jagori* Martens.

Philippine weavers were common in the grassland and rice fields, where they occurred in small flocks, usually among the plants near the ground and consequently unseen until they whirled up from underfoot. I saw the species at Brooke's Point, Sarong, Candauaga, Bonabona, Tagbariri, and Puerto Princesa.

*Munia cabanisi* Sharpe.

Cabanis's weaver was less common than the preceding species, but was found in the same habitat and at the same localities.

#### ORIOLIDÆ

*Oriolus acrorhynchus* Vigors.

The brilliant golden and black plumage of the Philippine oriole made it a conspicuous bird wherever it was found, and it was present throughout the region. My records are from all points except Dadagican. A single immature specimen was taken at Brooke's Point.

*Oriolus xanthonotus* Horsfield.

The black-headed oriole was rare and seen only at Brooke's Point. It was solitary and silent, and seemed fond of concealing itself in the denser parts of the foliage and of the forest. Three specimens were secured.

#### DICRURIDÆ

*Dicruropsis palawanensis* (Tweeddale).

The Palawan drongo was common in the forest at Brooke's Point and Candauaga but was not seen elsewhere. It was very

inquisitive in habits but was rather inclined to disappear, once its curiosity was satisfied. Specimens were taken at Brooke's Point.

*Bhuchanga palawanensis* Whitehead.

The Palawan gray drongo was seen at Brooke's Point, Candauaga, Bonabona, Calatugas, and Balabac. Specimens were secured at Brooke's Point. This bird was extremely graceful on the wing and seemed fond of performing its aerial evolutions. Along the trails and in the deeper parts of the forest it was often seen darting about through the trees or resting momentarily between flights.

#### STURNIDÆ

*Sturnia philippensis* (Forster).

At Tagbariri on April 6 I collected two females of this species from a flock, which had alighted in the top of a large dead tree. I saw no others in the region.

#### EULABETIDÆ

*Eulabes palawanensis* Sharpe.

The Palawan wattled myna was common in the forests and was seen at all points except Dadagican and Puerto Princesa. These birds are very interesting performers and have a variety of catcalls, whistles, squeaks, and whining notes, some of them quite unbirdlike and none of them musical. They often imitate their neighbors in the forest—birds and other creatures—sometimes with considerable success. They also readily learn to talk, for which reason they are common cage birds among the natives of the region. Specimens were taken at Brooke's Point.

*Lamprocorax panayensis* (Scopoli).

The Philippine glossy starling was abundant throughout the forest and about the dead trees in the clearings. Some of the birds appeared to be paired, such couples often keeping to themselves, but most of them were in flocks of a dozen or more individuals. They are compact little birds and can fly quite fast when they choose. I recorded the species at every locality except Dadagican and secured specimens at Brooke's Point.

#### CORVIDÆ

*Corvus pusillus* Tweeddale.

The little crow was rather common at all points except Dadagican. It was often heard, but it was very shy and was quick to take alarm when approached.

## Record of specimens of birds collected in Palawan Island in 1916.

Name.	No.	Sex.	Locality.	Date.
<i>Turnix fasciata</i> (Temminck) -----	1524	♂	Tagbariri -----	April 6.
	1489	♂	Brooke's Point -----	March 28.
<i>Treron nipalensis</i> (Hodgson) -----	1497	♂	do -----	March 31.
	1498	♀	do -----	Do.
	1457	♀	do -----	March 15.
<i>Muscadivores palawanensis</i> (Blasius) -----	1490	♂	do -----	March 28.
<i>Spilopelia tigrina</i> (Temminck and Knip) -----	1491	♀	do -----	Do.
<i>Squatarola squatarola</i> (Linnæus) -----	1509	♂	do -----	April 1.
<i>Ochthodromus geoffroyi</i> (Wagler) -----	1515	♀	do -----	April 2.
	1467	♀	Sarong -----	March 18.
<i>Numenius variegatus</i> (Scopoli) -----	1468	♀	do -----	Do.
	1459	♂	Brooke's Point -----	March 17.
<i>Demigretta sacra</i> (Gmelin) -----	1466	♀	Sarong -----	March 18.
	1384	♀	Brooke's Point -----	March 9.
<i>Cacatua hæmaturopygia</i> (P. L. S. Müller) -----	1385	♀	do -----	Do.
	1449	♂	do -----	March 14.
	1420	♂	do -----	March 12.
<i>Prioniturus cyaneiceps</i> (Sharpe) -----	1421	♀	do -----	Do.
	1450	♀	do -----	March 15.
	1510	♂	do -----	April 2.
	1358	♂	do -----	March 6.
<i>Tanygnathus lucionensis</i> (Linnæus) -----	1359	♂	do -----	Do.
	1514	♂	do -----	April 2.
<i>Gymnolæmus lemprieri</i> (Sharpe) -----	1424	♀	do -----	March 12.
	1395	♂	do -----	March 9.
	1402	♂	do -----	March 10.
	1401	♀	do -----	Do.
<i>Caprimulgus macrurus</i> Horsfield -----	1443	♂	do -----	March 13.
	1442	♂	do -----	Do.
	1439	♂	do -----	Do.
	1440	♂	do -----	Do.
	1441	♀	do -----	Do.
<i>Cacomantis merulinus</i> (Scopoli) -----	1444	♀	do -----	March 14.
	1351	♂	do -----	March 6.
<i>Chalcococcyx zanthorhynchus</i> (Horsfield) -----	1381	♂	do -----	March 8.
	1485	♂	do -----	March 28.
<i>Eudynamys mindanensis</i> (Linnæus) -----	1488	♂	do -----	Do.
	1487	♀	do -----	Do.
	1374	♀	do -----	March 8.
<i>Dryococcyx harringtoni</i> Sharpe -----	1469	♀	Balabac -----	March 20.
	1473	♀	Candauaga -----	March 22.
	1483	♀	Bonabona -----	March 25.
<i>Tiga everetti</i> Tweeddale -----	1342	♂	Brooke's Point -----	March 5.
	1386	♂	do -----	March 9.
<i>Thriponax hargitti</i> Sharpe -----	1460	♂	do -----	March 17.
<i>Pitta propinqua</i> (Sharpe) -----	1496	♂	do -----	March 31.
	1419	♂	do -----	March 12.
<i>Pitta atricapilla</i> Lesson -----	1495	♂	do -----	March 30.
	1470	♂	Balabac -----	March 20.
<i>Hemichelidon griseosticta</i> Swinhoe -----	1477	♂	Candauaga -----	March 22.
	1511	♂	Brooke's Point -----	April 2.

Record of specimens of birds collected in Palawan Island in 1916—Cont.

Name.	No.	Sex.	Locality.	Date.
<i>Cyornis lemprieri</i> Sharpe	1433	♂	do	March 13.
	1445	♂	do	March 14.
	1472	♀	Dandelit	March 21.
	1482	♂	Candauaga	March 23.
<i>Cyanoptila bella</i> (Hay)	1481	♀	do	Do.
	1484	♀	Brooke's Point	March 28.
<i>Hypothymis occipitalis</i> (Vigors)	1353	♂	do	March 6.
	1438	♀	do	March 13.
	1410	♂	do	March 11.
	1409	♀	do	Do.
<i>Xeocephus cyanescens</i> Sharpe	1426	♂	do	March 12.
	1435	♂	do	March 13.
	1521	♂	do	April 3.
	1346	♂	do	March 5.
<i>Artamides difficilis</i> (Hartert)	1345	♀	do	Do.
	1373	♂	do	March 7.
	1413	♀	do	March 11.
	1339	♂	Puerto Princesa	March 4.
<i>Pericrocotus igneus</i> Blyth	1429	♂	Brooke's Point	March 12.
	1428	♀	do	Do.
	1451	♂	do	March 15.
	1452	♀	do	Do.
<i>Ægithina viridis</i> (Bonaparte)	1464	♂	do	March 17.
	1463	♀	do	Do.
	1354	♂	do	March 6.
	1365	♂	do	March 7.
<i>Chloropsis palawanensis</i> (Sharpe)	1361	♀	do	Do.
	1364	♀	do	Do.
	1512	♀	do	April 2.
	1520	♂	do	April 3.
<i>Irena tweeddalei</i> Sharpe	1340	♀	Puerto Princesa	March 4.
	1417	♂	Brooke's Point	March 12.
	1418	♂	do	Do.
	1416	♀	do	Do.
<i>Microtarsus atriceps</i> (Temminck)	1475	♂	Candauaga	March 22.
	1476	♂	do	Do.
	1474	♀	do	Do.
	1341	♂	Puerto Princesa	March 4.
<i>Trichophorus frater</i> (Sharpe)	1390	♂	Brooke's Point	March 9.
	1430	♂	do	March 12.
	1434	♂	do	March 13.
	1347	♂	do	March 6.
<i>Pycnonotus cinereifrons</i> (Tweeddale)	1356	♀	do	Do.
	1378	♂	do	March 8.
	1412	(?)	do	March 11.
	1447	♂	do	March 14.
<i>Pycnonotus cinereifrons</i> (Tweeddale)	1480	♂	Candauaga	March 22.
	1392	♂	Brooke's Point	March 9.
	1478	♂	Candauaga	March 22.
	1479	♂	do	Do.
	1507	♂	Brooke's Point	April 1.
	1513	♂	do	April 2.

## Record of specimens of birds collected in Palawan Island in 1916—Cont.

Name.	No.	Sex.	Locality.	Date.
<i>Turdinus rufifrons</i> (Tweeddale)	1431	♂	do	March 13.
	1432	♀	do	Do.
	1369	♂	do	March 7.
	1380	♂	do	March 8.
	1376	♂	do	Do.
<i>Mixornis woodi</i> Sharpe	1377	♀	do	Do.
	1454	♂	do	March 15.
	1465	♂	do	March 17.
	1516	♂	do	April 4.
	1350	♂	do	March 6.
<i>Kittacincla nigra</i> Sharpe	1355	♂	do	Do.
	1375	♂	do	March 8
	1437	♀	do	March 13.
<i>Locustella ochotensis</i> (Middendorf)	1462	♂	do	March 17.
<i>Orthotomus ruficeps</i> (Lesson)	1371	♀	Brooke's Point	March 7.
	1422	♂	do	March 12.
	1436	♂	do	March 13.
<i>Hyloterpe whiteheadi</i> Sharpe	1423	♂	do	March 12.
	1456	♂	do	March 15.
	1453	♀	do	Do.
<i>Pardaliparus amabilis</i> (Sharpe)	1343	♂	do	March 5.
	1493	♀	do	March 29.
	1344	♂	do	March 5.
<i>Callisitta palawana</i> (Hartert)	1455	♀	do	March 15.
	1506	♂	do	April 1.
	1348	♂	do	March 6.
<i>Prionochilus johannæ</i> Sharpe	1399	♂	do	March 10.
	1403	♀	do	March 11.
	1501	♀	do	March 31.
<i>Acmonorhynchus affinis</i> Zimmer sp. nov	1446	♂	do	March 14.
	1499	♀	do	March 31.
<i>Æthopyga shelleyi</i> Sharpe	1370	♂	do	March 7.
	1471	♂	Balabac	March 20.
	1366	♂	Brooke's Point	March 7.
<i>Cinnyris sperata</i> (Linnæus)	1368	♂	do	Do.
	1388	♂	do	March 9.
	1448	♂	do	March 14.
	1367	♂	do	March 7.
	1393	♂	do	March 9.
<i>Cinnyris aurora</i> (Tweeddale)	1394	♀	do	Do.
	1398	♀	do	March 10.
	1407	♀	do	March 11.
	1360	♂	do	March 7.
	1363	♂	do	Do.
	1362	♂	do	Do.
	1391	♂	do	March 9.
<i>Anthreptes malaccensis</i> (Scopoli)	1400	♂	do	March 10.
	1406	♂	do	March 11.
	1405	♂	do	Do.
	1408	♀	do	Do.
	1504	♀	do	April 1.

## Record of specimens of birds collected in Palawan Island in 1916—Cont.

Name.	No.	Sex.	Locality.	Date.
	1389	♂	do	March 9.
<i>Aracknothera dilutior</i> Sharpe	1404	♂	do	March 11.
	1411	♂	do	Do.
	1486	♀	do	March 27.
<i>Motacilla ocularis</i> Swinhoe	1427	♀	do	March 12.
<i>Budytes leucostriatus</i> Homeyer	1503	♂	do	March 31.
	1458	♂	do	March 16.
<i>Anthus gustavi</i> Swinhoe	1494	♀	do	March 30.
	1505	♂	do	April 1.
	1492	♂	do	March 29.
	1500	♀	do	March 31.
<i>Anthus cervinus</i> (Pallas)	1502	♀	do	Do.
	1519	♂	do	April 3.
	1517	♀	do	Do.
	1518	♀	do	Do.
<i>Oriolus acrorhynchus</i> Vigors	1387	♀	do	March 9.
	1357	♂	do	March 6.
<i>Oriolus xanthonotus</i> Horsfield	1396	♀	do	March 10.
	1461	♂	do	March 17.
<i>Dicruropsis palawanensis</i> (Tweeddale)	1397	♀	do	March 10.
	1508	♂	do	April 1.
<i>Bhuchanga palawanensis</i> Whitehead	1352	♂	do	March 6.
	1349	♀	do	Do.
<i>Sturnia philippensis</i> (Forster)	1522	♀	Tagbariri	April 6.
	1523	♀	do	Do.
	1372	♂	Brooke's Point	March 7.
<i>Lamprocorax panayensis</i> (Scopoli)	1379	♀	do	March 8.
	1425	♂	do	March 12.
	1382	♀	do	March 8.
<i>Eulabes palawanensis</i> Sharpe	1415	♂	do	March 11.
	1414	♀	do	Do.



## TWO NEW SNAKES OF THE GENUS *HOLARCHUS* WITH DESCRIPTIONS OF OTHER PHILIPPINE SPECIES

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### TWO PLATES

Two recognized species of the genus *Holarchus*<sup>1</sup> have been described from the Philippine Islands; these are *Holarchus meyerlinkii* Steindachner<sup>2</sup> and *Holarchus ancorus* Girard.<sup>3</sup> In this paper *Holarchus maculatus* from central eastern Mindanao and *Holarchus burksi* from Mindoro are described as new.

### Genus *HOLARCHUS* Cope

*Coronella*, part., SCHLEGEL, Phys. Serp. (1837), 2, 50.

*Xenodon*, part., SCHLEGEL, op. cit., 80.

*Simotes*, part., DUMÉRIL and BIBRON, Mem. Ac. Sc. (1853), 23, 472; and Erp. Gén. (1854), 7, 624; GÜNTHER, Cat. Col. Sns. (1858), 23; JAN, Arch. Zool. Anat. Phys. (1863), 2, 232; GÜNTHER, Rept. Brit. Ind. (1864), 212; BOULENGER, Faun. Ind., Rept. (1890), 309; Cat. Sns. Brit. Mus. (1894), 2, 214.

*Holarchus* COPE, Proc. Am. Philos. Soc. (1886), 23, 488; STEJNEGER, Bull. U. S. Nat. Mus. (1907), 58, 333.

*Dicraulax* COPE, Am. Nat. (1893), 480.

<sup>1</sup> Stejneger [Bull. U. S. Nat. Mus. (1907), 58, 353] states: "The generic name *Simotes*, by which the snakes of this genus have long been designated is preoccupied by *Simotes* of Fischer for a group of mammals as early as 1817. It has consequently to be replaced. Cope proposed *Holarchus* in 1887, as a term for those species of the genus which have an undivided anal. It is not believed that this character alone which moreover is not always constant, is sufficient ground for a division of the genus, and as *Holarchus* is the name next in date after *Simotes* it must stand for the combined genus."

<sup>2</sup> Boulenger [Cat. Sns. Brit. Mus. (1894), 2, 224] has united this form with the southern Asiatic species *Simotes octolineatus* Schneider. He distinguishes it as Form C. Barbour [Mem. Mus. Comp. Zool. Harv. Coll. (1912), 44, 118] states: "It is very probable that '*Simotes meyerlinkii*' which Steindachner described from the Sulu Islands, is a valid species; it deserves a subspecific rank at least. The number of ventrals is low, 158 in Boulenger's specimen from Tawi-Tawi, and 156-161 according to Steindachner. The color is distinctive."

<sup>3</sup> Boulenger (op. cit., 225) has placed *Xenodon ancorus* Girard as a questioned synonym of this species. I am confident that these species are identical. Consequently the name *ancorus* of Girard will have precedence over *phænochalinus* of Cope, as the former antedates the latter by three years.

*Description (from Boulenger).*—Maxillary teeth eight to twelve, posterior very strongly enlarged and compressed; mandibular teeth subequal. Head short, not distinct from neck; eye rather small with round pupil; rostral large. Body cylindrical; scales smooth or feebly keeled, in 13 to 21 rows, with or without apical pits; ventrals rounded or obtusely keeled laterally. Tail short or moderate; subcaudals in two rows. Southern China, East Indian Archipelago. Four species are known to occur in the Philippine Islands.

*Key to the Philippine species of Holarchus.*

- $\alpha^1$ . Anal entire; scales in 17 rows.
  - $b^1$ . Third and fourth labials entering eye.
    - $c^1$ . Loreal as long as deep. Brown with a pink medial longitudinal line, an indistinct lateral line, and a row of dim black spots on second scale row. Below bright rose. *H. meyerlinkii* Steindachner.
    - $c^2$ . Loreal longer than deep. Pale brownish to lavender with 19 transverse dark spots. Below yellow to bright pink. *H. ancorus* Girard.
  - $b^2$ . Fourth labial entering eye; loreal absent. Pale lavender with 22 or 23 dark blackish brown dorsal blotches; yellowish below with black spots on ventrals. *H. maculatus* sp. nov.
- $\alpha^2$ . Anal divided; fourth labial entering eye; loreal present, little longer than wide. Dark purplish brown with a dull salmon streak dorsally; 22 narrow transverse blotches. *H. burksi* sp. nov.

*Holarchus meyerlinkii* Steindachner.

- Simotes meyerlinkii* STEINDACHNER, Sitzb. Ak. Wien (1891), 294; BARBOUR, Mem. Mus. Comp. Zool. Harv. Coll. (1912), 44, 118.
- Simotes octolineatus* BOULENGER, var. c., Cat. Sns. Brit. Mus. (1894), 2, 224.

*Description of species.*—Rostral broader than deep, the portion seen from above a little more than half its distance from the frontal; the internasals much smaller than the prefrontals, the suture between them little less than that between the prefrontals; latter broader than long, touching only the posterior part of nasal; frontal much longer than wide, longer than its distance from the end of the snout, longer and wider than the supraocular and longer than the parietals; latter longer than broad, bordered by two temporals, touching one postocular; nasal partially divided, longer than deep; a small square loreal present; preocular twice as long as wide; two postoculars, upper nearly twice as large as the lower; temporals 2 + 2, only the first upper touching the postoculars; six upper labials, the third and fourth entering the eye; the sixth and fifth rather narrowly in contact; mental small; seven lower labials (six on right side)

the first four bordering the first pair of chin shields (three on right side); second pair of chin shields about one-half as large as first pair; scales in 17 rows; 162 ventrals, rather angulate; anal single; subcaudals, 43; eye moderate, its diameter equal to its distance from anterior part of nostril.

*Color in life*.—Above reddish brown, with a median, salmon-pink longitudinal stripe covering one whole row, and two half scale rows; each scale of the median row with a darker center; laterally a dim grayish longitudinal stripe; on the second outer row of scales a series of dark dots; a series of dim dark spots on the outer edge of the ventrals. Head darker brown, with elongate black spots on the frontal and on the inner part of the parietals; a black stripe runs diagonally from neck to parietal; a dark spot below the eye. Belly bright rosy pink.

*Measurements*.—Total length, 305 millimeters; tail, 48.

*Remarks*.—This species appears to be confined to Sulu Archipelago; the only definite records are Tawitawi and Bongao.<sup>4</sup> These two records seem to be the only ones other than the types, which are labeled Sulu Islands with no definite localities named. This species is separated from *Holarchus octolineatus* on the basis of its distinctive coloration and the much fewer ventrals and subcaudal scales. The description is based on a single specimen collected by myself on Bongao, Sulu Archipelago, Philippine Islands, October 14, 1917.

*Holarchus ancorus* Girard.

*Xenodon ancorus* GIRARD, Proc. Acad. Philadelphia (1857), 182; U. S.

Exp. Expedit., Herp. (1858), 167.

*Simotes purpurascens* var. c. part., GÜNTHER, Cat. Col. Sns. (1858), 25.

*Simotes phaenochalinus* COPE, Proc. Acad. Philadelphia (1860), 244;

BOULENGER, Cat. Sns. Brit. Mus. (1894), 2, 225.

*Simotes ancoralis* JAN, Arch. Zool. Anat. Phys. (1863), 2, 233; Icon.

Gén. (1865), 11, Pl. VI, fig. 2; STEINDACHNER, Novara Rept. (1867), 61.

*Holarchus phaenochalinus* GRIFFIN, Phil. Journ. Sci., Sec. D (1911), 6, 259.

*Description of adult male*.—No. R429, E. H. T. collection. Manila, P. I., June 15, 1915. E. H. Taylor, collector. Rostral large, much higher than wide; portion seen above nearly equal to its distance from the frontal, sharply pointed behind; internasals small, wider than deep, their shortest suture being be-

<sup>4</sup> Barbour, loc. cit., states: "*H. meyerlinkii* (Steind.) was doubtless evolved by isolation from specimens of this species probably derived from Borneo."

tween the two, their longest suture with the prefrontal; the latter nearly twice as wide as deep, the suture between them somewhat longer than that between the internasals; frontal much wider in front than behind, longer than its distance from the end of the snout, little longer than wide, twice the width of the supraocular; parietals scarcely longer than wide, equal to or a little longer than the frontal; nasal partially divided, the anterior part largest; loreal longer than wide; one preocular, two postoculars; the supraocular twice as long as wide; temporals 1+2; seven upper labials, the third and fourth entering the eye; seven or eight lower labials, the first four in contact with the first pair of chin shields; mental small, wider than deep, not in contact with the anterior chin shields, which are one and one-half times the length of the posterior; scales in 17 smooth rows with no apical pits; eye large, equal to its distance from the nostril; ventrals, 163; anal single; subcaudals, 42. Eye less than its distance from the nostril.

*Color in life.*—Brownish lavender above with a series of eighteen large dark purplish spots edged with black, each extending across the back to the first or second row of scales; below immaculate cream yellow; subcaudals with dull brown spots; a large anchor-shaped, black-edged spot on the nape of the neck and on head, the front of which forms a band that crosses the head and eyes diagonally and includes the fifth and sixth labials; the main branch of the anchor, which runs back medially, increases in width toward the neck where it bifurcates, sending a branch to each side of the neck; a diagonal temporal streak present. Traces of a yellowish vertebral streak visible. Length, 551 millimeters; tail, 92.

*Variation.*—There seems to be much variation in this species as shown in Table I. The only definite localities given are on Luzon, and it is highly probable that specimens without locality marks are also from that island. The ventrals vary between 149 and 165; the subcaudals, 34 and 43. The temporals vary equally between 1+2 and 2+2. One specimen (No. 1554, Bureau of Science collection) has only a single labial entering the eye, which is the third; however there is an obvious fusion of the third and fourth labials. In No. 700, Bureau of Science collection, the anchor-shaped marking is disconnected on the frontal, thus following the marking in *H. burksi*. In all the specimens save the one described there are indications of narrow bands between the larger dark bands; they are usually represented by a few irregular dots across the body or merely by

TABLE I.—*Holarchus ancorus Girard.*

No.	Sex or age.	Locality.	Length. <i>mm.</i>	Tail. <i>mm.</i>	Ventrals.	Sub-caudals.	Upper labials.	Lower labials.	Labials entering eye.	Scale rows.	Temporals.	Collection.
613	yg.	Manila.....	220	26	160	34	7	8	third and fourth.....	17	1+2	Bureau of Science.
700	yg.	Benguet.....	280	45	164	43	7	8	do.....	17	2+2	Do.
752	♂	Unknown.....	545	85	165	40	7	7	do.....	17	2+2	Do.
820	♀	Zambales.....	475	65	163	37	7-8	7	do.....	17	2+2	Do.
910	♂	Bataan.....	515	85	163	42	7	7	fourth and fifth.....	17	{1+2 2+2}	Do.
1554	♂	Unknown.....	498	87	149	43	6	7	third.....	17	1+2	Do.
459	♂	Manila.....	551	92	163	42	7	8	third and fourth.....	17	1+2	E. H. Taylor.

lateral dots. No variations are noted in the number of preoculars, postoculars, anal, or loreals.

*Remarks.*—Boulenger<sup>5</sup> has placed *Xenodon ancorus* (Girard)<sup>6</sup> as a questioned synonym of this species. The differences in the descriptions are obvious. There are two preoculars (the lower one is very small), and there are eight upper labials with the fourth and fifth entering the eye. It is highly probable that it is merely a variation from normal condition as it otherwise agrees with the normal form. In one of the specimens (No. 820, Bureau of Science collection) we have the increased number of labials on one side and the fourth and fifth labials entering the eye.

*Holarchus maculatus* sp. nov. Plate I.

*Type.*—No. 40, E. H. T. collection; Bunawan, Agusan, P. I., August, 1912. E. H. Taylor, collector.

*Description of type.*—Rostral moderate, higher than wide; portion visible above less than half its distance from the rostral; suture between the internasals as large as or larger than the prefrontal suture; prefrontals much larger than the internasals, in contact laterally with two labials; frontal hexagonal, its length equal to the parietals, a little longer than its distance from the end of the snout; parietals small, as wide as long; nasal not or at least only partially divided; the nostril pierced near the posterior margin; no loreal present; two small preoculars, upper twice as large as lower; supraocular not twice as long as wide; two postoculars; temporals 1+2 (on left side 1+1); seven upper labials, only the fourth entering the eye; labials in the following order of size: 6, 4, 5, 7, 3, 2, 1; mental small, twice as wide as deep; seven lower labials, three touching the first chin-shields, which are larger than the second pair; eye equal to its distance from the nostril or minutely less. Scales smooth, in 17 rows. Ventrals, 164; anal single; subcaudals double, 54 in number.

*Color in life.*—Above pale lavender with a series of twenty-three broad, blackish brown dorsal spots extending laterally to the ventrals. Dorsally they are seven or eight scales wide, but are narrowed laterally to a width of one or two scales; spots are edged with narrow whitish lines; the nuchal stripe runs forward and stops with a blunt point on the frontal scale; a narrow band crosses the head anteriorly and includes the

<sup>5</sup> Boulenger, Cat. Sns. Brit. Mus. (1894), 2, 225.

<sup>6</sup> I have not seen the type.

eyes; a dark blotch on the temporals, which is connected with the band; small spots on the nasals; chin yellow; on the edges of one-half of the ventrals are small spots that involve one or two of the body scales; on each alternate ventral are two larger rectangular spots; throat variously spotted with dark. Ventral surface yellow; below tail, yellowish with no or very few spots. Total length, 299 millimeters; tail, 59.

*Variation.*—A second specimen taken at the same locality (No. 41, E. H. T. collection) is very different in scalation, but it seems to be an abnormal specimen. A small loreal is present on the right side of the head; two preoculars are fused into one on the left side. The first lower labial on both sides is broken in two, making it appear that there is a pair of minute chin shields behind the mental. The temporal elements on the right side are not normal, the parietal is broken and there are two anterior temporals. In coloration and marking they are practically identical.

TABLE II.—*Holarchus maculatus* sp. nov.; two specimens in collection of E. H. Taylor.

No.	Locality.	Length.	Tail.	Ventrals.	Subcaudals.	Upper labials.	Lower labials.	Preoculars.	Postoculars.	Loreal.	Labials enter eye.	Scale row.	Temporals.
		mm.	mm.										
40	Bunawan, Agusan.	299	59	164	54	7	7	2	2	0	1	17	2+3 1+3
41	do	258	50	162	54	7	7	2-1	2	1-0	1	17	2+3 1+3

*Remarks.*—Both specimens are from Bunawan, Agusan. They were collected by myself from under piles of sod. This form is obviously different from other Philippine species. The markings are distinctive; the loreal is absent and only a single labial enters the eye; two preoculars are present. These characters together with many minor differences separate it from *H. meyerlinkii* and *H. ancorus*. From *H. burksi* it is separated by markings and coloration and the above mentioned characters, save that of the single labial entering the eye in which the two forms agree.

*Holarchus burksi* sp. nov. Plate II.

*Type.*—No. 200, E. H. T. collection. Sumagui, Mindoro, P. I., December, 1916. Clark Burks, collector.

*Description of type.*—Head rather distinct from the neck; rostral high, bending back over the snout, pointed behind; internasals narrowed on the inner side, much wider than long, the suture between them much less than the prefrontal suture; prefrontals somewhat rectangular in shape, almost twice as wide as long; frontal shield-shaped, much longer than its distance from the end of the snout, equal to the parietal in length, not twice as broad as the supraocular but of nearly equal length; parietals as broad as long, bordered by two temporals; nasal medium, undivided, the anterior portion much the higher; loreal large, longer than wide; a single elongate preocular, widely separated from the frontal; two subequal postoculars; temporals 1+2; seven upper labials, the fourth alone entering the eye; upper margin of labial series very much broken; seven lower labials, four touching the large chin-shields; second pair of chin-shields about one-half the size of first pair; scales in 17 rows, smooth; smallest scales dorsal, of angular shape; laterally, scales larger and rounding; ventrals, 154; anal divided; subcaudals, 32.

*Color in life.*—Above grayish brown, becoming grayer laterally, with a median, dorsal, salmon-pink streak the length of the body. Body traversed by twenty saddlelike blotches, which widen medially to the width of three scales and narrow greatly laterally, usually to the width of one scale. The blotches are black, inclosing a gray spot, dorsally, the entire blotch edged with a narrow grayish white line, less apparent medially. Between each two blotches laterally there is a series of two or three small, elongate, white-edged dark spots, each smaller than a scale. Neck with a forked blotch, each leg of which begins laterally at the seventh ventral and goes up and forward where the two meet medially, some distance behind the parietals, and run forward much narrowed to the middle of the frontal; a dark broad line present below the eye, which is more or less continuous with a band crossing the snout on about the anterior level of the eyes. A line beginning on second ventral runs up diagonally to the parietals; a spot below the nostril and another on the sixth labial. Two or three spots on the lower labials; four ventrals on neck with spots. Ventrally immaculate brilliant rosy pink, almost red toward end of body. Total length, 381 millimeters; tail, 47.

*Remarks.*—In markings this species resembles much the Philippine *Holarchus ancorus*, but it is well differentiated by a single labial entering the eye, the undivided nasal, and the divided anal. It agrees with *H. woodmasoni* and *H. maculatus* in having a single labial entering the eye. The differences from the

latter are pointed out under that species; from the former it differs by a very much reduced number of subcaudals and ventrals, and the undivided anal; the coloration also is totally different. Its closest affinity seems to be *H. beddomii*, which also has an undivided nasal and divided anal. This differs in having the fourth and fifth labials entering the eye, and the markings and colorations are quite different. I take pleasure in dedicating this handsome species to Mr. Clark Burks, who collected the unique specimen and presented it to me.



## ILLUSTRATIONS

[Drawings by P. Moskaira.]

- PLATE I. *Holarchus maculatus* sp. nov., from the type.  
II. *Holarchus burksi* sp. nov., from the type.



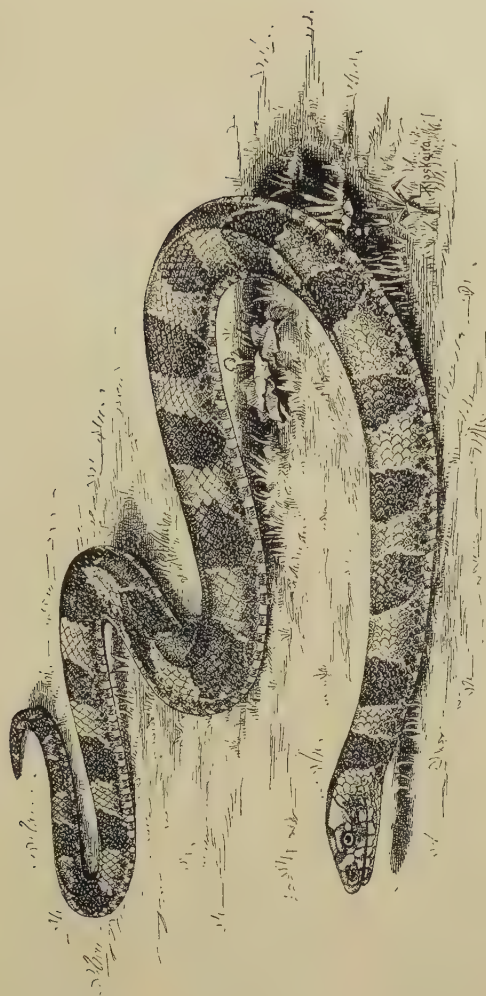
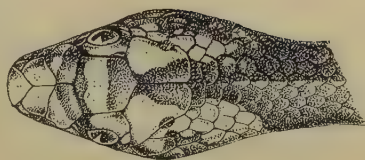


PLATE I. *HOLARCHUS MACULATUS* SP. NOV.





PLATE II. *HOLARCHUS BURKSI* SP. NOV.



## SIXTH CONTRIBUTION TO THE COLEOPTERA FAUNA OF THE PHILIPPINES

By W. SCHULTZE  
(Manila, P. I.)

ONE PLATE

The Coleoptera herein described are mainly a few of the many species collected by my Filipino collector on a trip to the main cordillera of Panay Island in May, 1918, and on another trip to Ilocos Norte Province, Luzon, in August, 1918. The latter collection was made in the mountains at the extreme north-western corner of Luzon.

### NEW SPECIES OF CURCULIONIDÆ

#### Genus *PROAPOCYRTUS* novum

Rostrum with a prominent medial groove, extending to the vertex, and a strongly pronounced cross groove before the eyes. Antenna with the first and second funicular joints of equal length, third to seventh also equal in length, together one-fifth longer than the first and second. Prothorax subcylindrical, dorsally somewhat flattened, with an anterior and a posterior submarginal groove. Elytra dorsally flattened, laterally strongly and abruptly declined in an acute angle, apically produced, on the posterior decline with prominent subsutural ridges, and the apical ends of the elytra divergent. Hind femora reaching to about the third fourth of the length of the elytra posteriorly.

Type of the genus, *Proapocyrtus insularis* sp. nov.

This genus is most nearly related to *Apocyrtus* Erichs.,<sup>1</sup> but it is easily recognizable by the oblong oval and dorsally flattened form of the elytra, against the more spherical and inflated form of the above-mentioned genus.

*Proapocyrtus insularis* sp. nov. Plate I, fig. 1.

Black, with pale green scale spots. Rostrum very irregularly and coarsely, front more finely, sparsely, and scatteredly punctured. The medial groove broad, on the front and vertex fine and narrow. Prothorax strongly coriaceous, with an irregular medial groove. A small spot at the middle laterad and another

<sup>1</sup> Heller, K. M., *This Journal* Sec. D (1912), 7, 301.

larger spot at the lateral margin. Elytra very coarsely and irregularly punctate-striate, the interstices forming raised ridges. The lateral declines of the elytra with deep elongated depressions. Each elytron with eight scale spots, and one bifid spot on the suture at the posterior decline. The former spots are located as follows: Two near the base, one of which at the lateral margin is the largest; four in the middle area, two of which are at the disk, one at the lateral decline, the other at the lateral margin; another spot at the apical third, and another in the apical triangle. Legs finely and scatteredly punctured, the tibiae finely and sparsely setose.

Length, 15 millimeters; width of elytra, 6.5.

PANAY, Capiz Province, mountains near Jamindan (type) (my collector); and two other specimens from PANAY, Antique, Culasi (*R. C. McGregor*).

The spots are somewhat variable in color; in one of the specimens from Culasi they are blue.

*Pseudapocyrus multimaculatus* sp. nov. Plate I, fig. 2.

Shiny black, with pale green spots. Rostrum densely and irregularly punctured. A prominent medial groove from the base of the rostrum reaching to the vertex. A large scale spot on the front. Prothorax as long as broad, strongly coriaceous. A prominent medial groove, beset with scales, laterad of which a broad irregular scale stripe, another at the lateral margin. Elytra shiny, irregularly punctate-striate, the punctures very coarse. The interstices forming slightly elevated ridges or callosities. Spotted areas depressed. Basal area with a series of six irregular pale green scale spots. At the middle, forming a cross row, a series of four spots and in the apical third a series of five slightly larger spots. A lateral marginal stripe extending from the base to the second third only. In the posterior half a subsutural series of spots, forming a stripe which terminates near the apex. Underside with a spot at the lateral margins of the meso- and metathoracic and the visible part of the abdominal segments. Legs finely and sparsely punctured and rugose and finely setose.

Length, 12 millimeters; width of elytra, 5.5.

LUZON, Ilocos Norte, Mount Palimlim. Type in my collection.

*Macrocyrtus ilocanus* sp. nov. Plate I, fig. 10, ♀.

Shiny black. Rostrum, at the apex slightly broader than at the base, apically finely and densely punctured, more coarsely and irregularly toward the front. A very well-pronounced medial groove reaching to the front of head and a shallow triangular

depression in the middle area of the rostrum. Prothorax as long as broad at the base. An oblong spot at the posterior margin laterally, and another at each lateral margin; a fine interrupted line of scales along the anterior margin. Elytra oblong oval, one and one-half times as long as broad, finely and regularly punctate-striate. Each elytron with eight irregular pale greenish white scale spots. The spotted area slightly depressed. Two spots at the base, one of which is the largest spot at the discal area and the other at the lateral margin. Two spots at the middle, the outer one reaching almost to the lateral margin. Three spots forming a cross row in the apical third and one spot in the apical triangle. Between the last-mentioned spots a number of scattered scales along the margin. In the male the latter spots approach each other more than in the female. Legs sparsely punctured and finely setose. Tibiæ with a few tubercles on the underside.

Female, length, 17 millimeters; width of elytra, 8. Male, length, 17.5 millimeters; width of elytra, 7.5.

LUZON, Ilocos Norte, Mount Palimlim. Types in my collection.

The female of *Macrocyrthus ilocanus* is similar in form to the female of *M. erosus* Pasc. Both of these species and *M. benquetanus* Schultze have the apical ends of the elytra more or less divergent and differ in this respect from the type of this genus, *M. nigrans* Pasc.

*Metapocyrthus* (*Artapocyrthus*) *panayensis* sp. nov. Plate I, fig. 4, ♀.

Black, with pale yellowish green spots, elytra almost entirely pink or violet with bare spots. Rostrum densely and irregularly confluent punctured with a medial groove reaching to the vertex and a cross groove at the base. An oblong narrow pale green scale spot reaching the front. Prothorax subglobose, slightly broader than long, coarsely and confluent punctured, with an anterior and posterior submarginal groove. At the middle laterally a roundish pale yellowish green scale spot and another larger spot at the lateral margin confluent with a narrow anterior marginal band. Elytra oblong oval, irregularly punctate-striate; in the female apically slightly produced; covered with violet scales, with the exception of the following bare areas and yellowish markings: Beginning at the base and along the suture a bare area, expanded spotlike at the middle from which an irregular oblique band extends toward each lateral margin. At the lateral margin three squarish bare spots and another at the suture and the apical triangle. The violet of the elytra turns into yellowish green near the margins. In

the male the bare sutural area is more in shape like a + and the oblique bands are reduced to a lateral spot. Underside rugose and finely setose. Legs: Femora with a ring spot apically, sparsely punctured, finely rugose and setose; tibiae coarsely rugose and setose, with a few small tubercles on the underside.

Female, length, 13 millimeters; width of elytra, 5.5. Male, length, 11 millimeters; width of elytra, 4.5.

PANAY, Mount Macosolon. Types in my collection.

This species and *Pachyrrhynchus jugifer* Waterh. were collected together from the same plant.

*Metapocyrtus* (*Orthocyrtus*) *orbiferoides* sp. nov. Plate I, fig. 7, ♀.

Shiny black, elytra with pink scales and bare spots. Rostrum irregularly scatteredly punctured, less toward the front, with a large, medial, oblong triangular depression terminating in a punctiform impression on the front. Prothorax as long as broad, greatest width before the middle, finely and scatteredly punctured. A narrow pale green scale stripe along the anterior margin, continued along the lateral and posterior margin, and terminating in an oblong spot, laterad of the middle at the posterior margin. Elytra punctate-striate; with pink scales, except the following bare areas: At the basal half a large squarish spot at the suture and another irregular spot on each elytron, forming an irregular cross band. Beyond the middle a series of five spots, one at the suture, and two on each elytron. The former and latter sutural spots are narrowly confluent along the suture. Another small bare spot at the lateral margin apically and another at the suture. Underside with a pale green spot at the meso- and metathoracic segments laterally. Legs sparsely and scatteredly punctured and finely rugose and setose.

Length, 13.5 millimeters; width of elytra, 6.7.

LUZON, Ilocos Norte, Mount Nagapatan. Type in my collection.

This species resembles very much *Pachyrrhynchus orbifer* Waterh.

*Metapocyrtus congestus* sp. nov. Plate I, fig. 3.

Shiny black, with large oval blue scale spots. Rostrum densely and confluent punctured, with a pronounced medial depression. A large blue scale spot from the base to the front. The latter finely and scatteredly punctured. Sides of head finely rugose. Prothorax with a fine anterior submarginal and a more pronounced posterior submarginal groove, and finely and sparsely punctured. A large oval scale spot at the middle laterad,

another still larger one at each lateral margin. Elytra finely punctate-striate. Each elytron with nine large blue oval scale spots, which approach each other closely. The spots are arranged in three cross rows; the basal row contains two, the medial three, the postmedial two, one marginal spot is located between the medial and latter row and another spot on the apical triangle. Underside and legs irregularly punctured and finely setose, especially the tibiae.

Length, 11.5 millimeters; width of elytra, 4.5.

LUZON, Benguet, Baguio (*O. Schütze*). Type in my collection.

This species looks very much like small specimens of *Pachyrhynchus congestus* Pasc. and was collected together with that species from the same plant.

*Homalocyrtus pretiosus* sp. nov. Plate I, fig. 9, ♀.

Dark brown. Rostrum anteriorly broader than at the base. A very strongly pronounced medial groove reaching to the front beset with golden green scales and a well-pronounced basal cross groove. Apical part densely and finely punctured, the punctuation toward the base becoming coarse and on the vertex scattered and sparse. An oblong scale spot at the sides of head. Prothorax broader than long, a fine anterior submarginal groove, coarsely and densely punctured, especially toward the sides, the punctuation confluent. A longitudinal irregular medial groove-like depression beset with golden green scales and an oblong spot laterad from before the middle to the hind margin. Lateral marginal area also with golden scales, the same continued along the anterior margin, forming a narrow band which is interrupted discally. Elytra of female evenly oval in form, the hind slope evenly rounded; male with an oblong bare protuberance at the suture and posterior decline. The latter nearly rectangular. The elytra coarsely and irregularly but moderately densely punctured, the punctures confluent near the suture, from each puncture a fine hair arises. Each elytron with a series of nine, more or less distinct, longitudinal golden green scale stripes; these are very irregular and interrupted, especially at the middle somewhat laterad where thus two bare cross bands are formed. These bare areas are still larger in the male. Underside finely setose, a lateral marginal spot at the mesothoracic segment, abdominal segments rugose laterally. Legs finely setose, reddish brown, black at the apex of the femora and tibiae, the latter with a number of small tubercles on the underside. Tarsi black and finely setose.

Female, length, 16.5 millimeters (without rostrum); width of elytra, 8.5. Male, length, 14.5 millimeters (without rostrum); width of elytra, 7.

LUZON, Ilocos Norte, Mount Palimlim. Types in my collection.

This species is related to *H. tomidosus* Heller.

*Polycatus panayensis* sp. nov. Plate I, fig. 8.

Black with very irregular light blue or bluish white iridescent cross bands on the elytra. Rostrum twice as long as broad, with a prominent medial carina which is broader at the apex and terminates between the eyes. Laterad of the carina an oblong dash of light blue scales. Front of head slightly depressed. Prothorax with an oblong smooth and shiny area at the disk, the same surrounded by a series of very coarse punctures. Laterad of this area an indistinctly defined light blue dash and short line on each lateral margin. Very coarse and irregularly scattered punctures are situated laterad of the discal area. Elytra very much inflated, striate-punctate, the punctures larger, as in *P. aurofasciatus* Heller. A number of very irregular cross bands, connected at intervals by short lines along the striae and thus forming an irregular net work. A stripe along the lateral margin. This stripe is bluish white, near the base opalescent blue. Interspaces rugose, finely and scatteredly punctured, and beset with short bristles, especially apically. Underside beset with greenish blue scales. Legs bluish iridescent, sparsely punctured and setose.

Length, 18 millimeters; width, 8.

PANAY, Capiz Province, mountains near Jamindan. Type in my collection.

This species is larger and much stouter than either *P. aurofasciatus* Heller or *P. eupholoides* Heller.

*Calidiopsis lineata* sp. nov. Plate I, fig. 5.

Dark brown with very fine creamy white scales, elytra beset with rather long bristles. Head: Antenna, the scape densely beset with fine black bristles, the funicular joints creamy white. Rostrum with a fine longitudinal medial groove and a creamy white stripe extending to between the eyes where the latter becomes bifid. Thorax longer than broad, greatest width before the middle, coarsely and irregularly punctured. A creamy anterior marginal line, a medial line, and another at each lateral margin extending from the anterior to the posterior margin. Elytra striate. Each interstice with a row of granules, from each of the latter arises a bristle. A medial band across the

disk becoming confluent at the seventh interstice with a longitudinal stripe, the latter extending from the anterior margin to the apical triangle. Another stripe at each lateral margin and a sutural stripe extending from the base to the medial band only. An abbreviated stripe at the fifth interstice near the anterior margin and another abbreviated stripe on the third interstice in the apical triangle. Underside and legs closely covered with creamy white scales. The legs beset with fine bristles.

Length, 9.5 millimeters; width, 4.

MINDANAO, Misamis, Kolambugan (*C. S. Banks*). Type in my collection. Cotype No. 18365 in College of Agriculture collection.

#### A NEW CERAMBYCID

*Doliops imitator* sp. nov. Plate I, fig. 6.

Black, head with a longitudinal medial groove and a reddish tomentose stripe reaching to the vertex. Antenna, first and second joints black, the following reddish brown, darker at the apex. Prothorax with a prominent groove parallel to the hind margin. A few scattered punctures at the discal area and coarser and irregularly scattered punctures at the lateral margins. A narrow band along the anterior and posterior margin, and the lateral area reddish tomentose. Elytra very finely coriaceous. Basal half with irregularly scattered coarse punctures, confluent near the shoulders. Elytra pinkish gray tomentose with the exception of the following bare areas: A nearly square spot at the shoulder; slightly beyond the middle a combination of three spots, which are confluent at the suture; one on each elytron, forming an irregular cross band, and another spot at the suture directed toward the base. At the posterior third another combination of three smaller confluent spots forming also a cross band, the larger one situated at the suture and continued to the apical triangle. All of the bare spots are surrounded by an interrupted line of creamy white tomentose dots, underside more or less tomentose, a spot at the lateral margin of each abdominal segment. Legs shiny bluish black. Femora with a small spot near the apex, above and below. Tibiæ with a fringe of short black bristles.

Length, 10.5 millimeters; width, 4.5.

LUZON, Ilocos Norte, Mount Nagapatan. Type in my collection.

Specimens of this species and of *Metapocyrtus orbiferoides* sp. nov. were collected with a very large number of specimens

of *Pachyrrhynchus orbifer* Waterh. from the same plant. The general resemblance of *Doliops imitator* to the former species and even greater resemblance to some of the forms of the latter species are truly remarkable. Even the fine lines surrounding the bare spots, so characteristic in *P. orbifer* Waterh., are well pronounced in this mimetic cerambycid.

Concerning the problems of mimicry<sup>2</sup> and the fundamental reasons for it with reference to Coleoptera as applied to the above species, belonging to different genera of one family or to entirely different and widely separated families, the most essential factor for any consideration at all would be that such mimetic species are found together in the same locality or even on the same plant. In this respect it is worth mentioning the following species which would enter into consideration based on actual observation and data:

*Pachyrrhynchus orbifer* Waterh., *Metapocyrtus orbiferoides* Schultze, and *Doliops imitator* Schultze. Collected from the same plant, on Mount Nagapatan, Ilocos Norte, Luzon.

*Pachyrrhynchus reticulatus* Waterh., *Pachyrrhynchus gloriosus* Faust, *Metapocyrtus* (*Orthocyrtus*) *pachyrrhynchoides* Heller, *Metapocyrtus* (*Orthocyrtus*) *bakeri* Heller, and *Doliops pachyrrhynchoides* Heller. Collected together in Paete and on Mount Banahao, Luzon.

*Pachyrrhynchus congestus* Pasc., *Metapocyrtus congestus* Schultze, and *Alcides schuetzei* Schultze. All from the neighborhood of Baguio, Benguet, Luzon.

*Pachyrrhynchus jugifer* Waterh. and *Metapocyrtus panayensis* Schultze. From the same locality and the same plant; Mount Macosolon, Capiz, Panay.

It seems premature for the present, aside from the above-mentioned facts, to enter into any reasonable explanation for the above mimetic forms, since much more exact data are necessary on the subject. By the examination of large numbers of birds' stomachs we hope to obtain some more information. This work is being carried on in coöperation with Mr. R. C. McGregor.

## RHIPIDOCERIDÆ

### NEW CALLIRHIPIS SPECIES

*Callirhipis macgregori* sp. nov.

*Male*.—Brownish red. Head densely punctured, eyes relatively large and produced. Antenna red, first joint rather long. Prothorax densely punctured, at the middle, laterally, with a large shallow depression, inside of which is located a fovea, the

<sup>2</sup> Heller, K. M., *This Journal*, Sec. D (1912), 8, 299.

depression extends to the posterior margin. Another shallow depression at the posterior margin above the scutellum. Elytra coarsely punctate-striate, the punctures large and square, separated by distinct carinæ. Legs and underside red, also punctured, the latter as well as the upper side finely but scantily pale yellowish pubescent.

Length, 12.5 millimeters; width, 3; length of antenna, 8.

PANAY, Antique, Culasi (*R. C. McGregor*). Type in my collection.

This species is related to *C. tiaongona* Schultze but is easily distinguished from the latter by the longer antennæ and the larger and more-produced eyes.

*Callirhipis viracensis* sp. nov.

*Male*.—Dark brown, very finely and closely silver-grayish pubescent, but without the plushlike iridescent appearance of *C. lagunæ* Schultze. Head irregularly punctured, a bare spot at the front. Prothorax closely and confluent punctured. At the disc, laterad, a rather large fovea, and at the middle near the posterior margin two other shallow depressions and another larger depression at the posterior margin laterad. The latter is continued on each elytron. Elytra coarsely and irregularly punctate-striate. Underside very closely and finely punctured and finely pubescent.

Length, 14 millimeters; width, 4; length of antenna, 7.

CATANDUANES, Virac (my collector). Type in my collection.

From *C. helleri* Schultze this species is easily distinguished by the relatively short antenna, the length of which in the latter species is 17 millimeters and in *C. lagunæ* 16 millimeters.



## ILLUSTRATIONS

[Drawings by W. Schultze.]

### PLATE I

- Fig. 1. *Proapocyrtus insularis* sp. nov.  $\times 2$ .  
2. *Pseudapocyrtus multimaculatus* sp. nov.  $\times 2$ .  
3. *Metapocyrtus congestus* sp. nov.  $\times 2$ .  
4. *Artopocyrtus panayensis* sp. nov.  $\times 2$ .  
5. *Calidiopsis lineata* sp. nov.  $\times 2$ .  
6. *Doliops imitator* sp. nov.  $\times 2$ .  
7. *Orthocyrtus orbiferoides* sp. nov.  $\times 2$ .  
8. *Polycatus panayensis* sp. nov.  $\times 2$ .  
9. *Homalocyrtus pretiosus* sp. nov.  $\times 2$ .  
10. *Macrocyrtus ilocanus* sp. nov.  $\times 2$ .



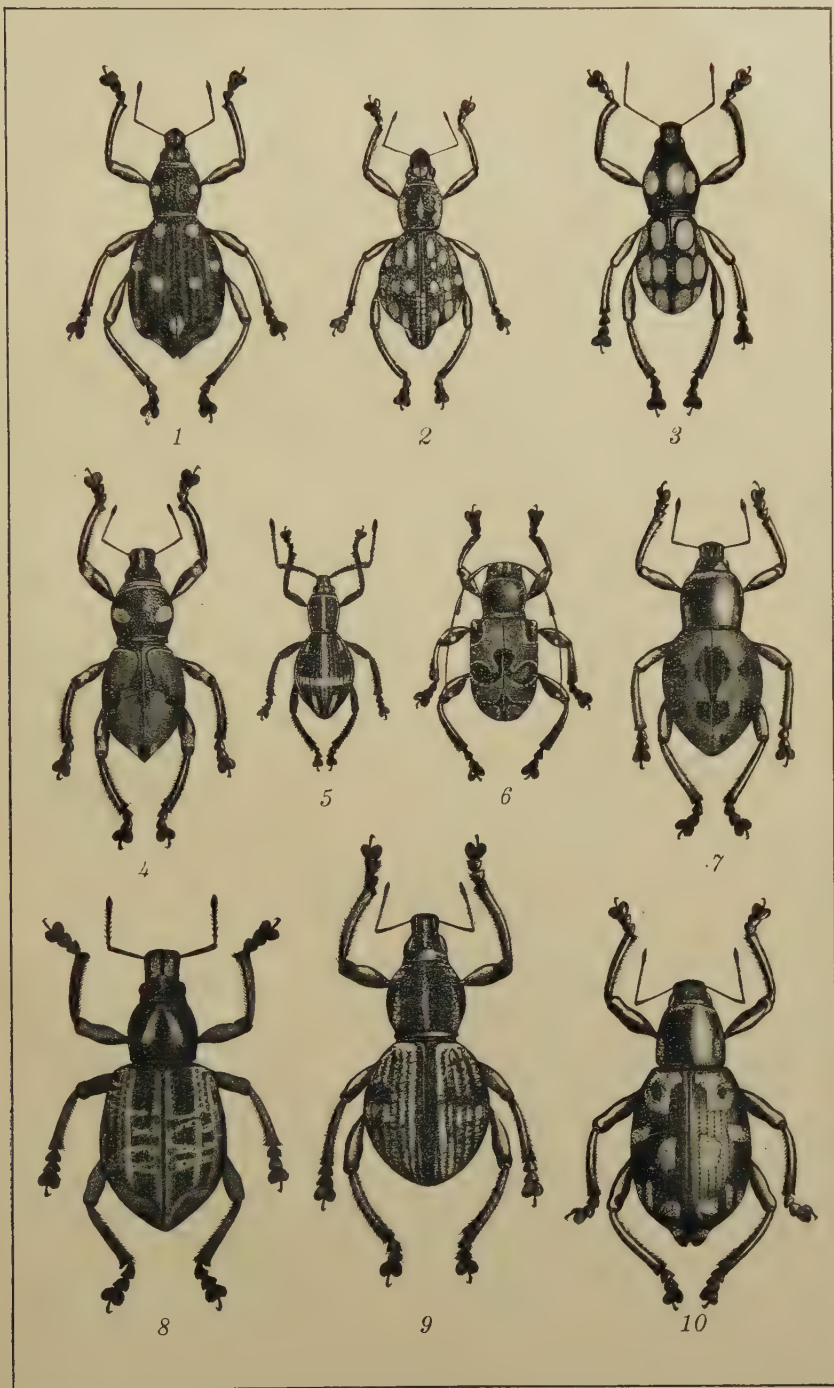


PLATE I. NEW PHILIPPINE COLEOPTERA.



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